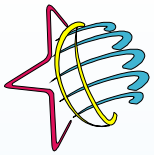

MeteoStar® ... The Weather Symbol Of Excellence

The IPS MeteoStar Advantage

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IPS MeteoStar
Leaders In Weather and Data Fusion Software

IPS MeteoStar, Inc.
2323 S. Troy St., Suite 5-111
Aurora, CO 80014 USA
Phone: (303) 338-0512 x307
Fax: (303) 338-0955
Email: flewis@meteostar.com

IPS MeteoStar International
5801 Lee Highway
Arlington, VA USA
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Email: hfallek@meteostar.com

http://wxweb.meteostar.com
http://meteostar.com

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IPS MeteoStar Systems & Products Overview

- Example Applications & Products
- IPSM Organization, Clients, and System Architecture
- *LEADS* Meteorological Workstation
- *NOAAPort Plus* Receivers
- High Resolution *Magellan* Imagery Receivers
- Environmental Monitoring Systems (*EMS*)
- 3-D / 4-D Visualization (*EWB*)
- High Resolution Weather Forecasts (*ADAS / MM5*)
- Aviation Meteorology Systems (*LEADS &*

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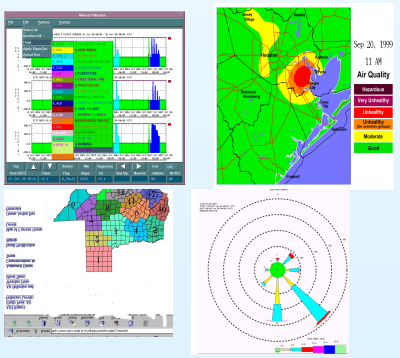
IPSM Applications

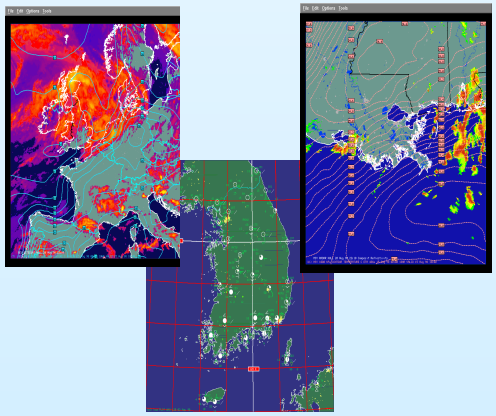
Military

Aviation

Commercial Forecasting

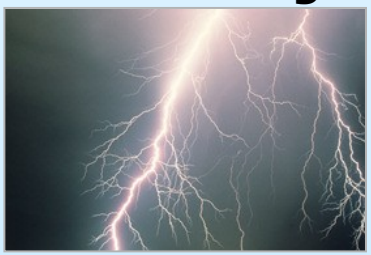


Environmental Monitoring



General Meteorology

Power Utilities



Hydrology and Water Resources

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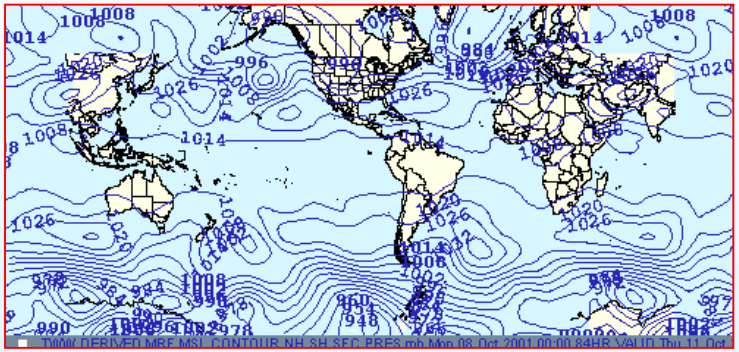
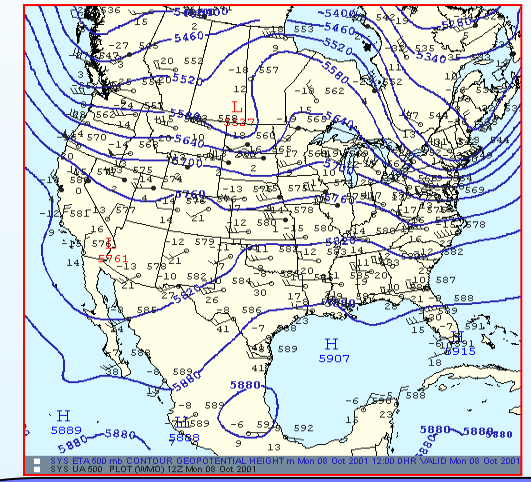
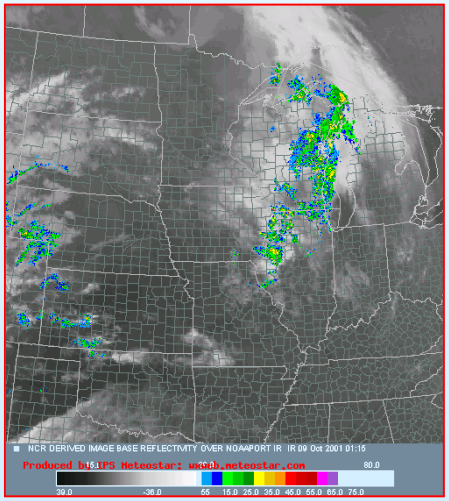
PRODUCT SAMPLES



Surface Graphics Products



Upper Air Graphics Products



Composite Image/ Graphics Products

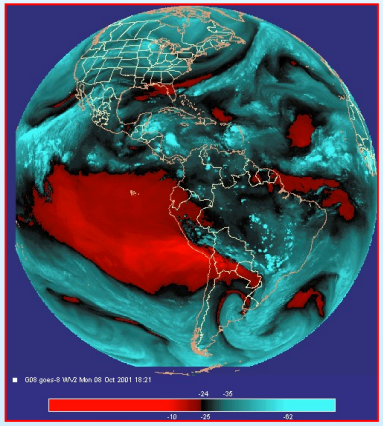


Image Products

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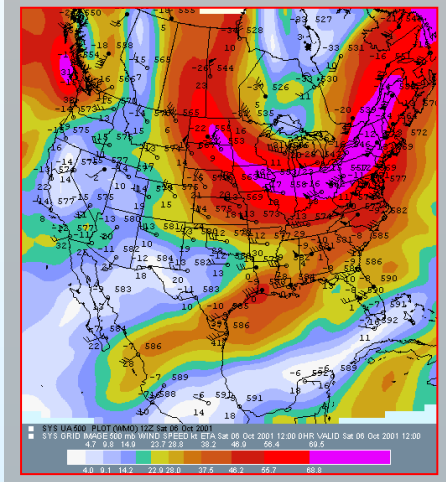
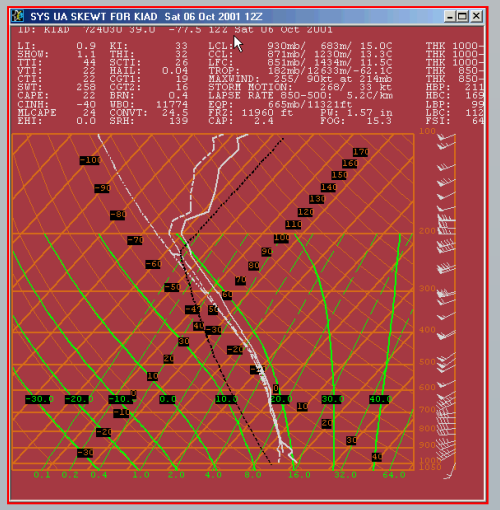
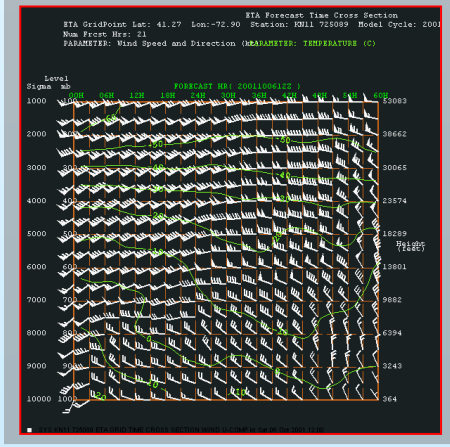
UPPER-AIR GRAPHICS PRODUCTS

(Multiple Map Projections and Scales)





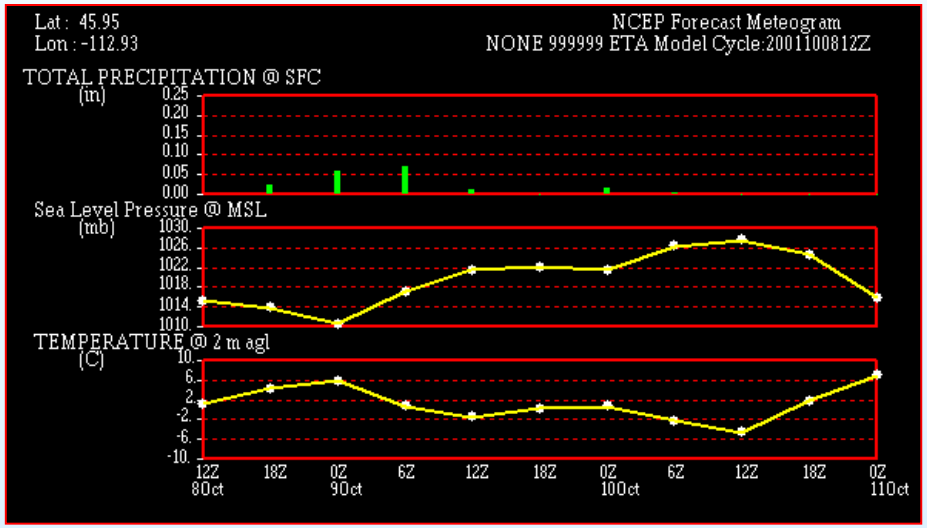


- **Mandatory Pressure Charts**
  - Geopotential Height
  - Isotherms
  - Isotachs
  - Station Plot
- **Thermodynamic Diagrams**
  - Skew T Log P
  - Tephigram
  - Stuve (soon to be added)
- **Vertical Cross-Sections (time and space)**
- **Customized Products (Over 100 user-specified parameters and diagnostics available)**
  - Vorticity
  - Vorticity Advection
  - Water
  - Divergence
  - IR Transmissivity
  - Turbulence
  - Precipitable
  - Icing
  - Geostrophic

SURFACE GRAPHICS PRODUCTS

(Multiple Map Projections and Scales)

- **Standard Surface Charts**
  - **Isobars**
  - **Isotherms**
  - **Station Model Plots**
- **Customized Surface charts (Over 100 user-specified parameters and diagnostics available)**
  - **Convergence**
  - **Streamlines**
  - **Temperature Advection**
  - **Pressure Tendency**
  - **Precipitation**
- **Image Derived Fields**
  - **Vegetation Index**
  - **Sea Surface Temperature**



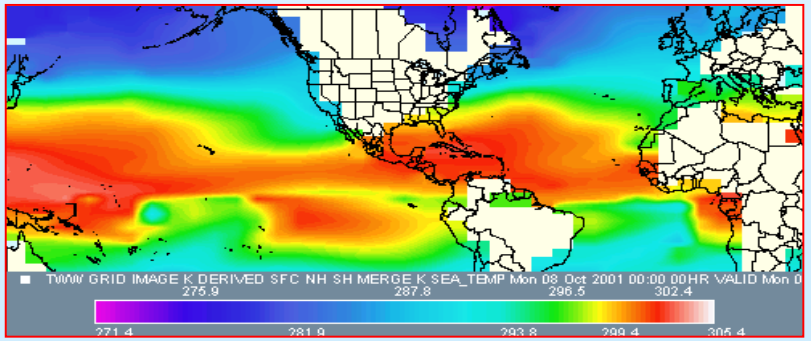


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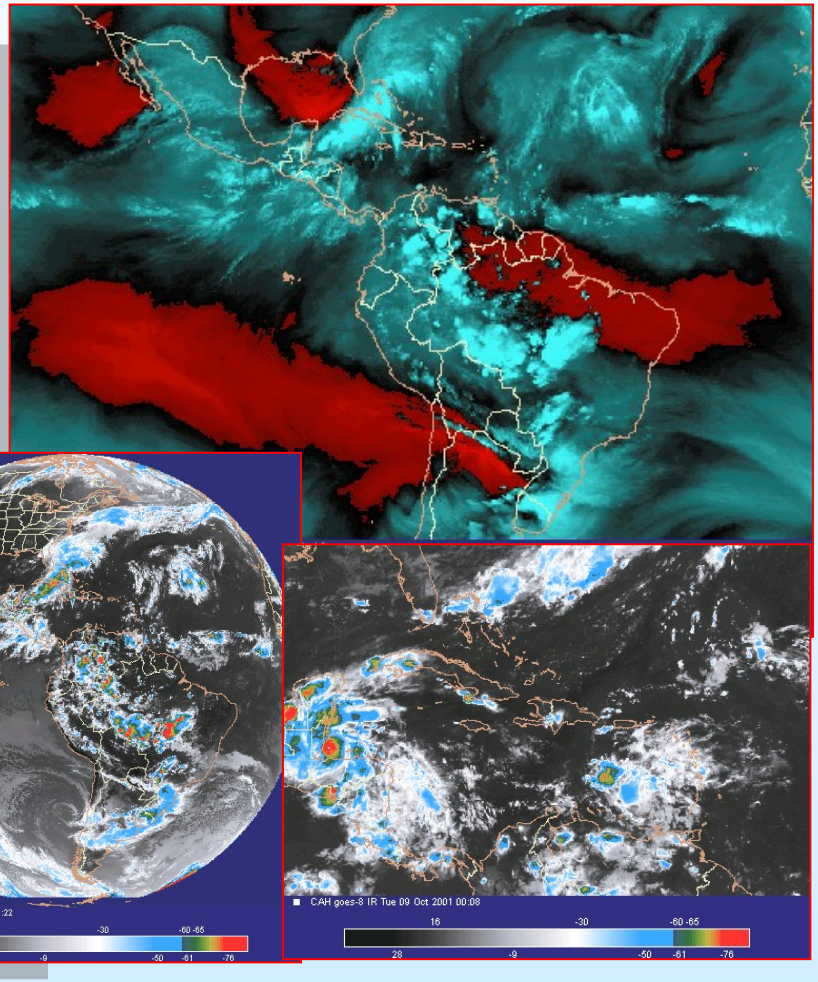
IMAGE PRODUCTS

- Color and Grey Scale Enhanced Images
- Smoothed/Filtered Images
- Zoom/Pan Images
- Animation
- Analysis Products
  - Temperature/Height/Reflectivity Display
  - Temperature/Height/Reflectivit Contours
- Multi-Spectral Products
  - Sea Surface Temperature
  - Vegetation Index
  - Hotspot Detection
  - Arithmetic Combined Image
  - Fog Detection
  - Volcanic Ash Cloud detection



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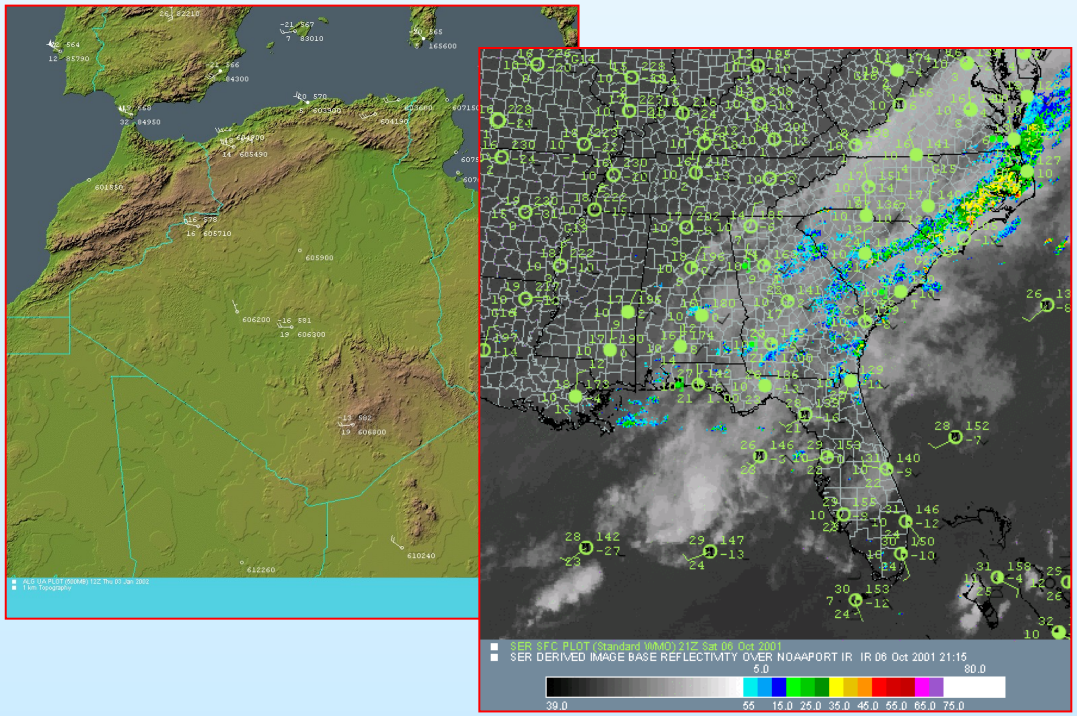
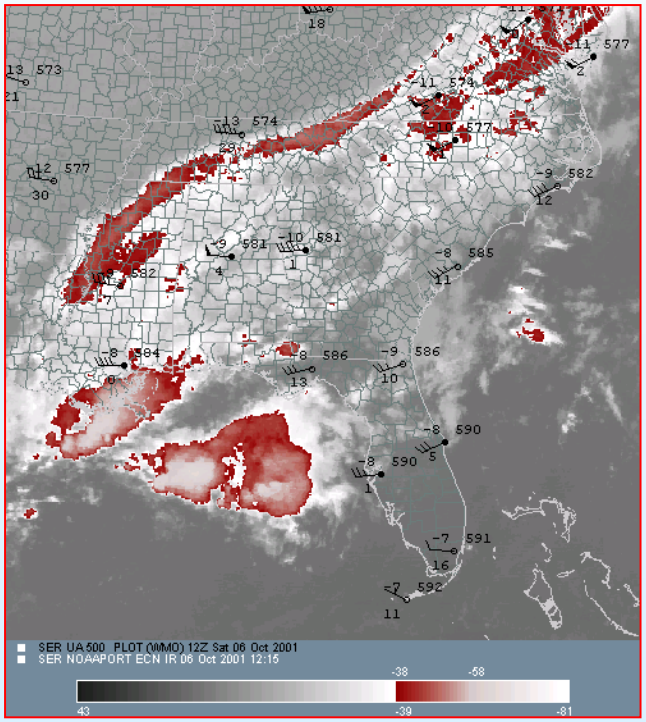
Composite Image/ Graphics Products

Surface products superposed on satellite and/or radar and/or topography images





Sounding products superposed on satellite and/or radar images

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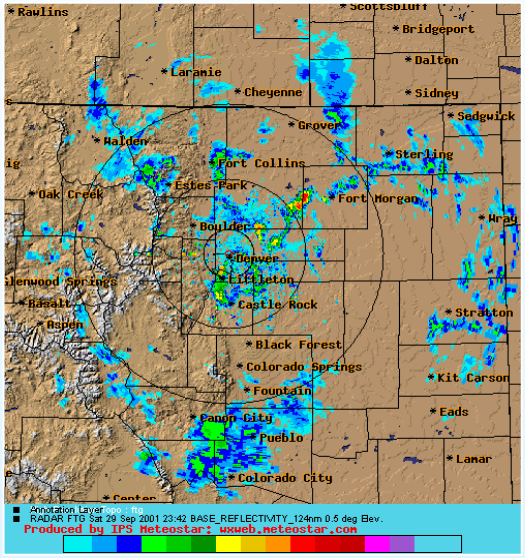
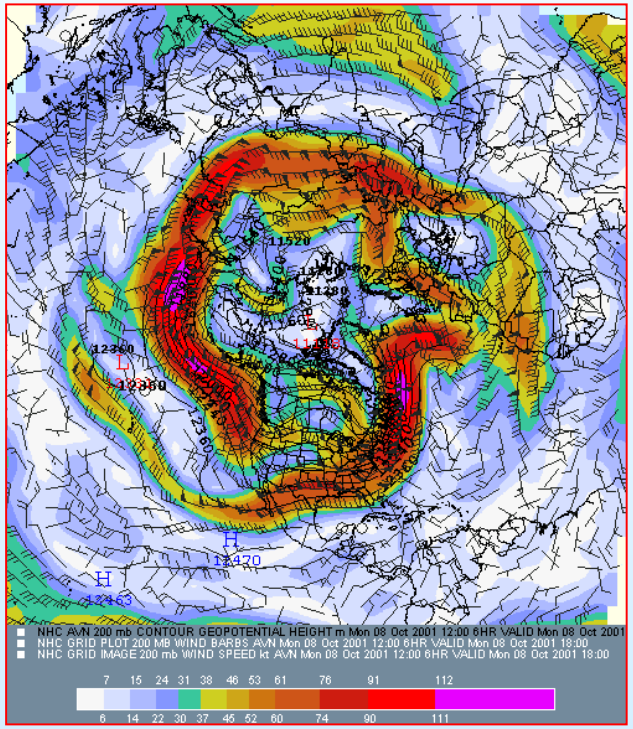
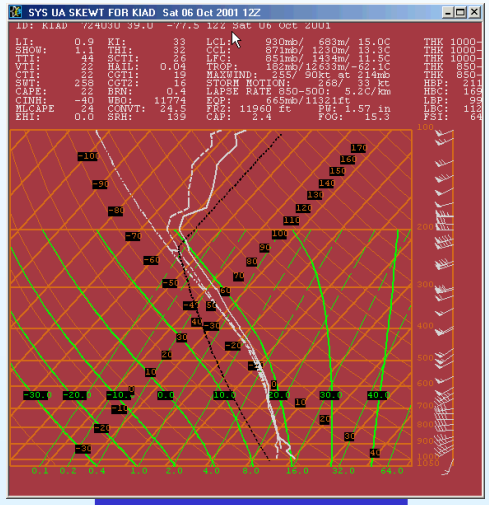
Products used for General Meteorology



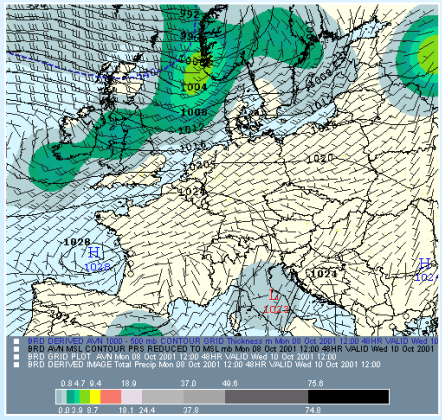
High-Res Radar Map



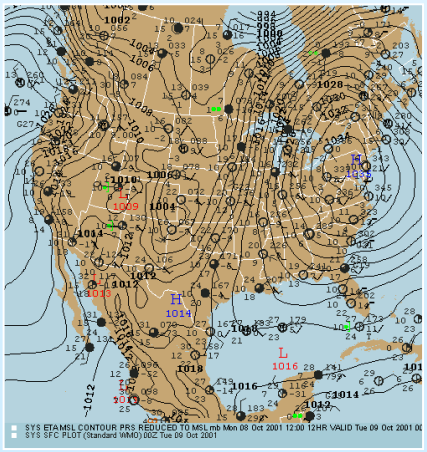
N.H. Jet Stream Forecast Map



Skew-T Chart



Precip Forecast Map



Surface Chart

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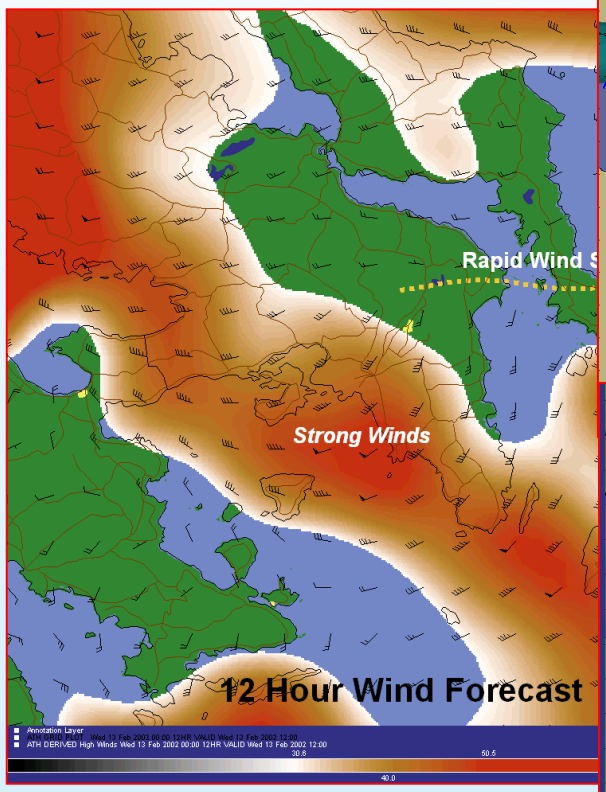
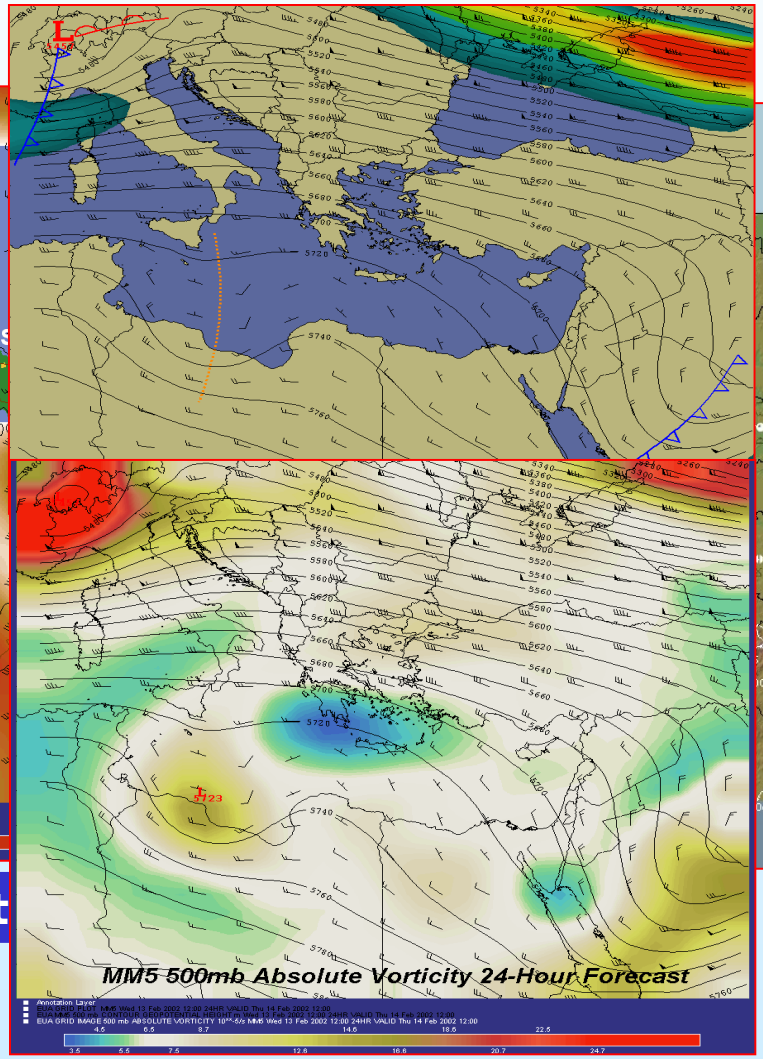
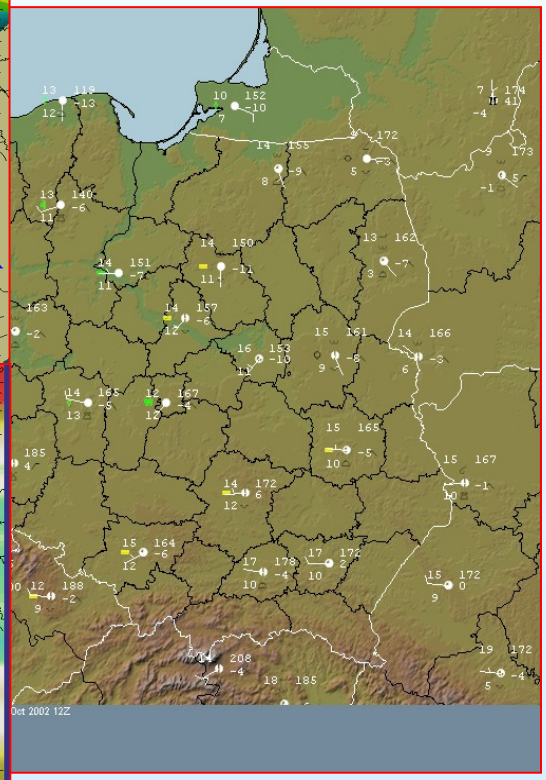
Products to Support General Meteorology (cont...)



12 Hour Surface Forecast





Surface Plot

24 Hour Heights, Wind and Absolute Vorticity Charts

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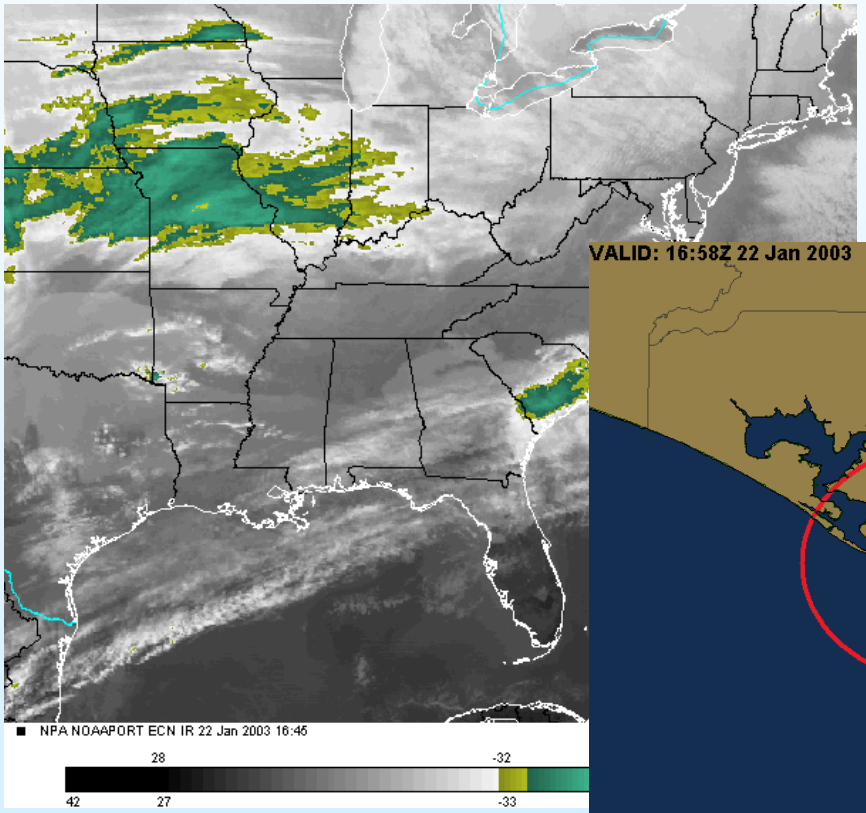
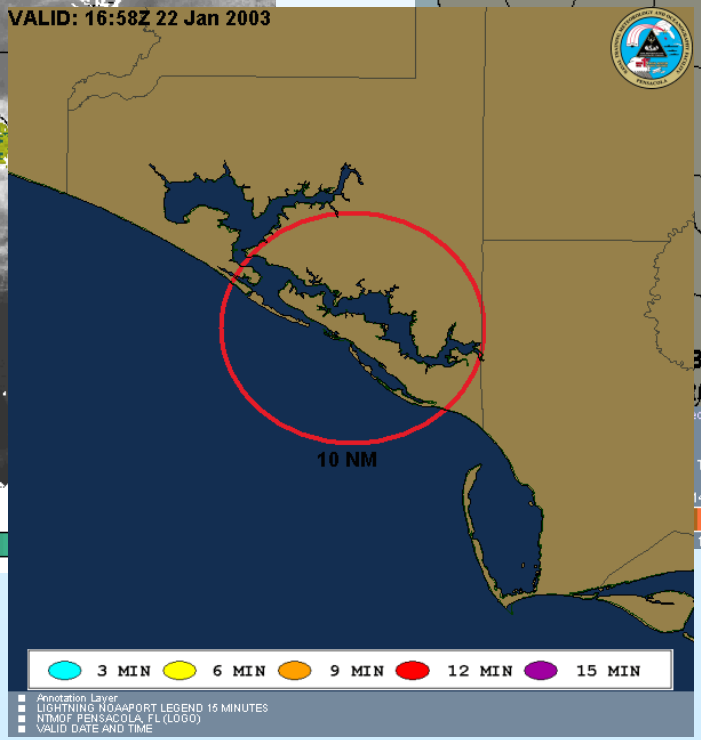
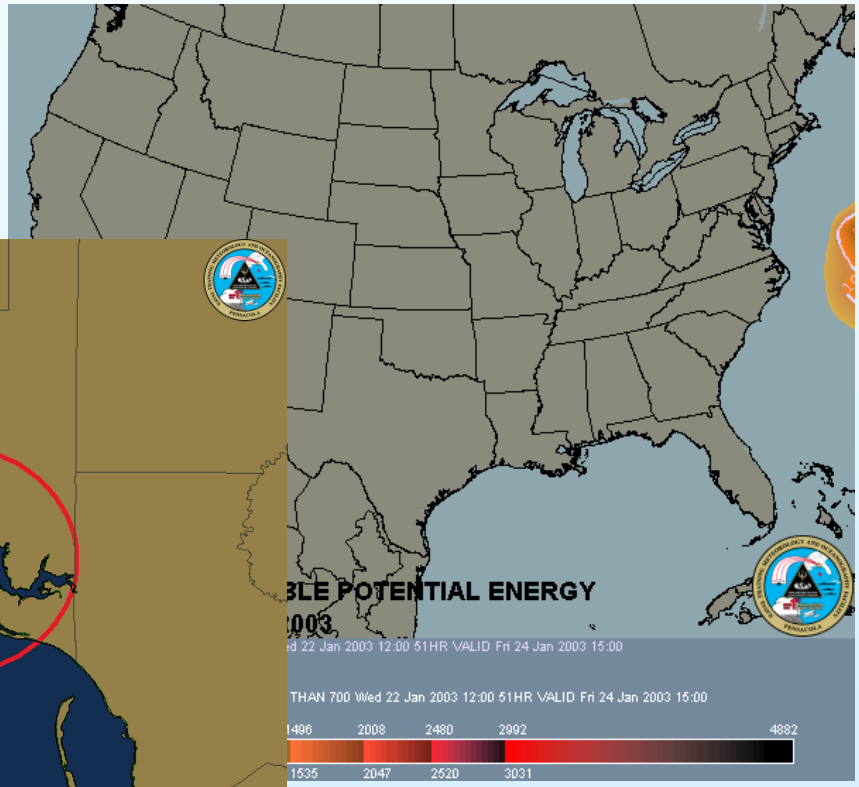
Products to Support Worldwide Applied Forecasting



IR Satellite Chart



KPAM Current Lightning Chart



CAPE Forecast Chart

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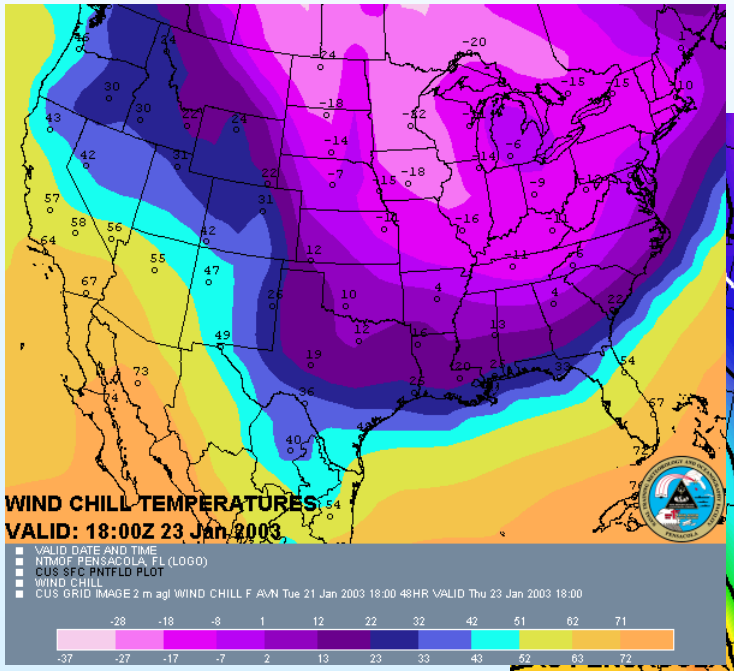
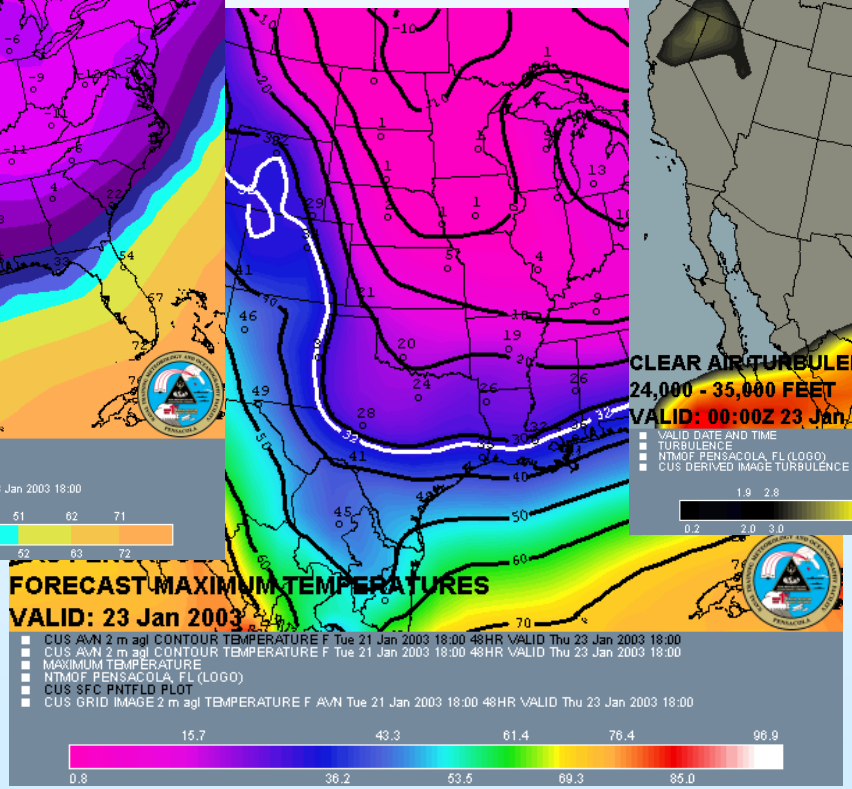
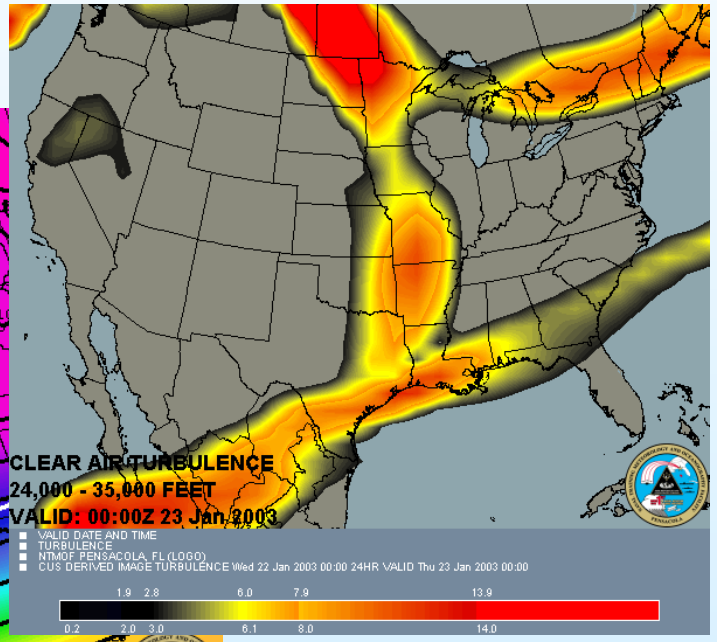
Products to Support Worldwide Applied Forecasting (Cont)



Wind Chill Chart



Max / Min Temperature Chart



Turbulence Chart

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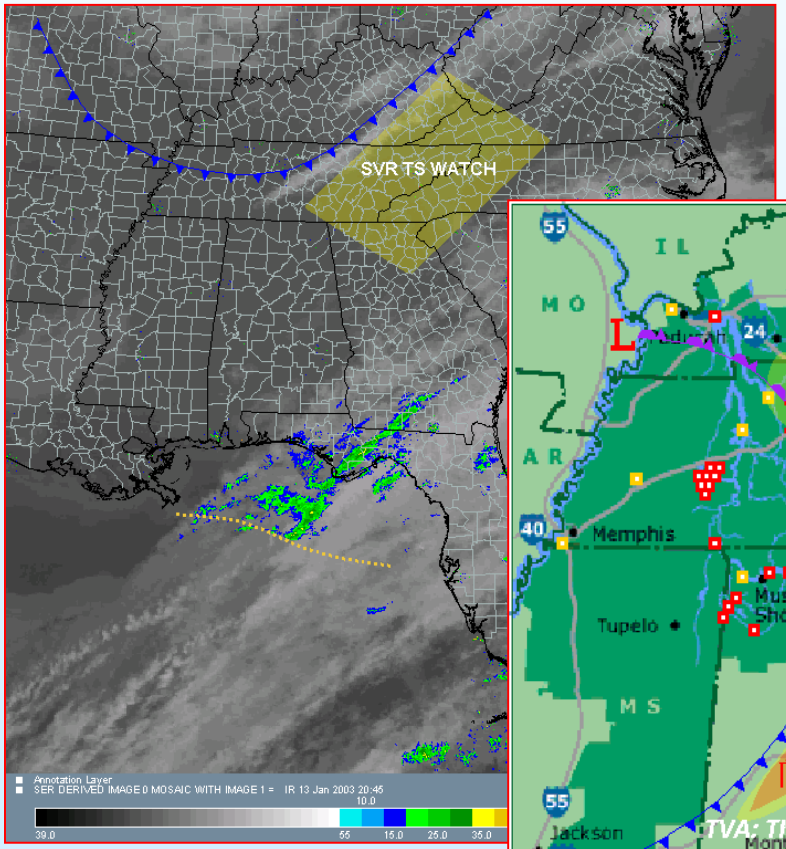
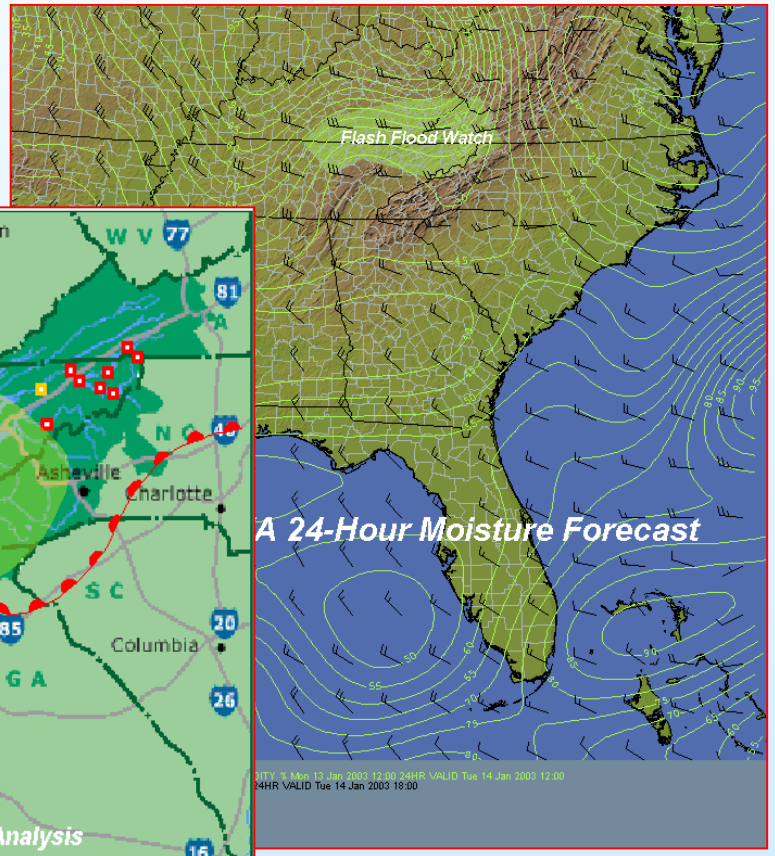
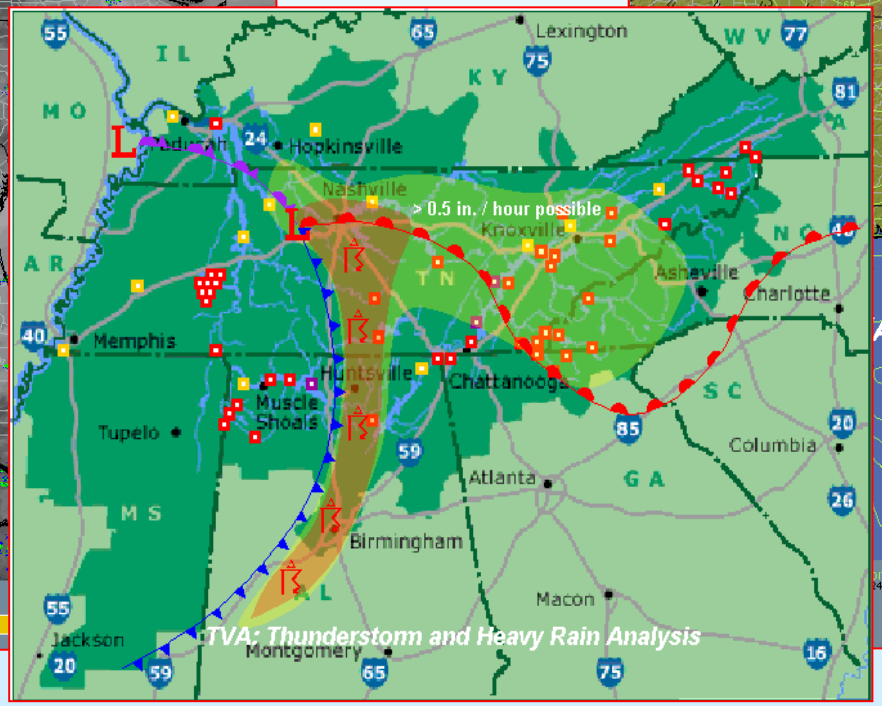
Products to Support Regional Operations

Surface Satellite / Radar Chart



24 Hour Moisture Forecast





Forecast Clouds / Surface Pressure / Thickness Chart

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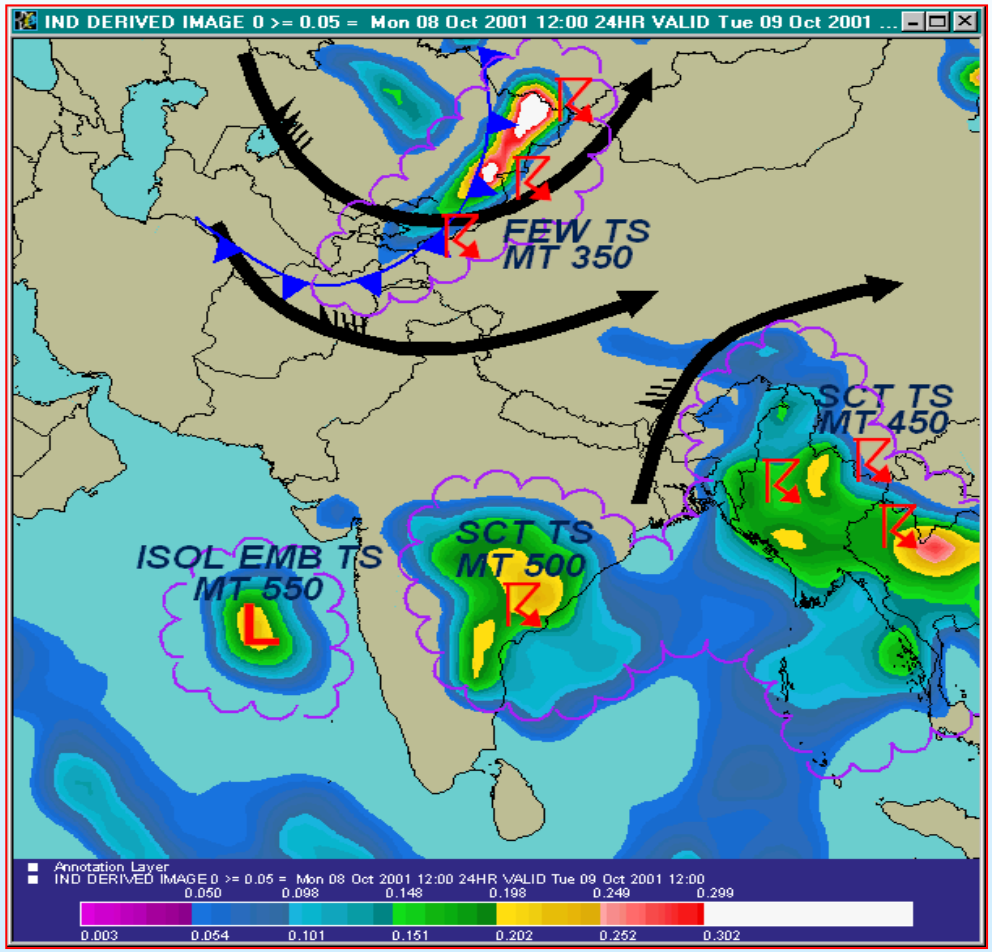
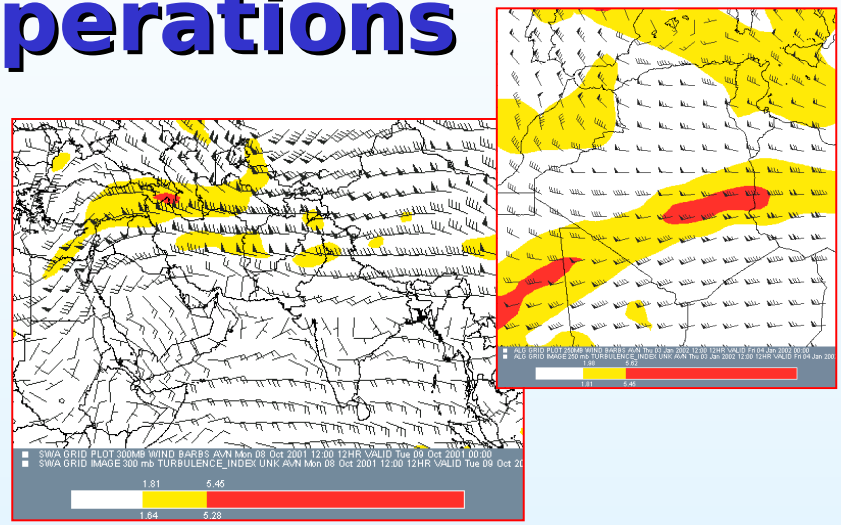
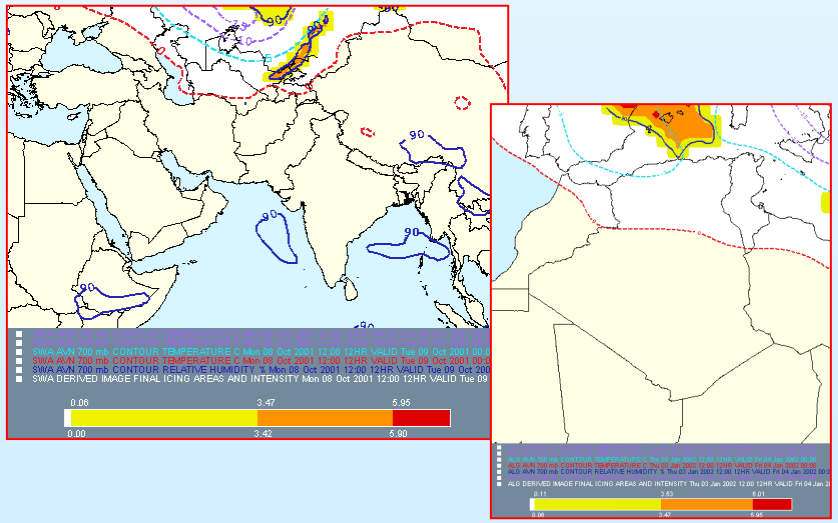
Products to Support Worldwide Military Operations







Significant Weather Chart

Icing / Turbulence Charts

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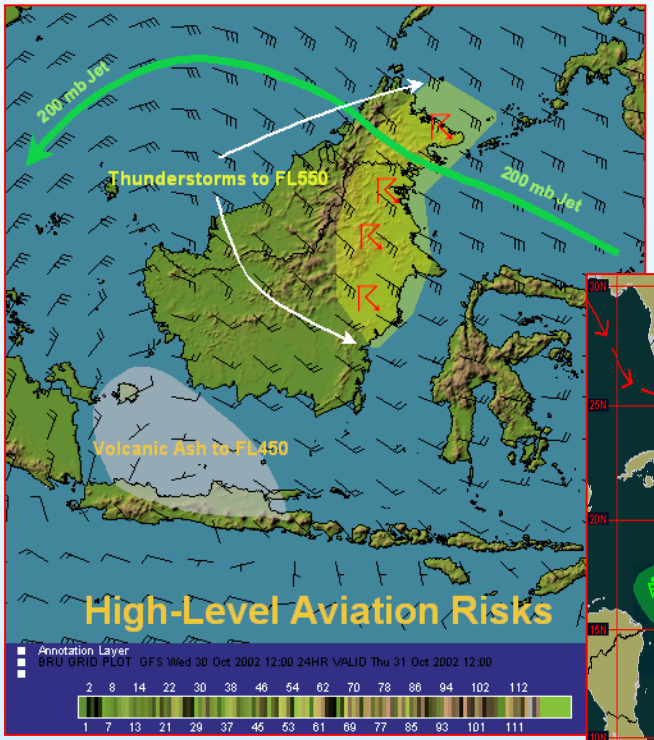
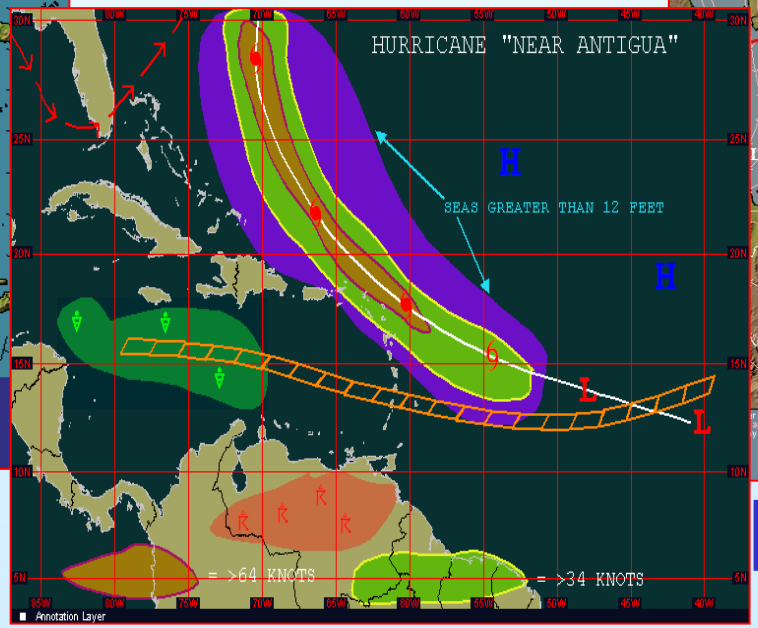
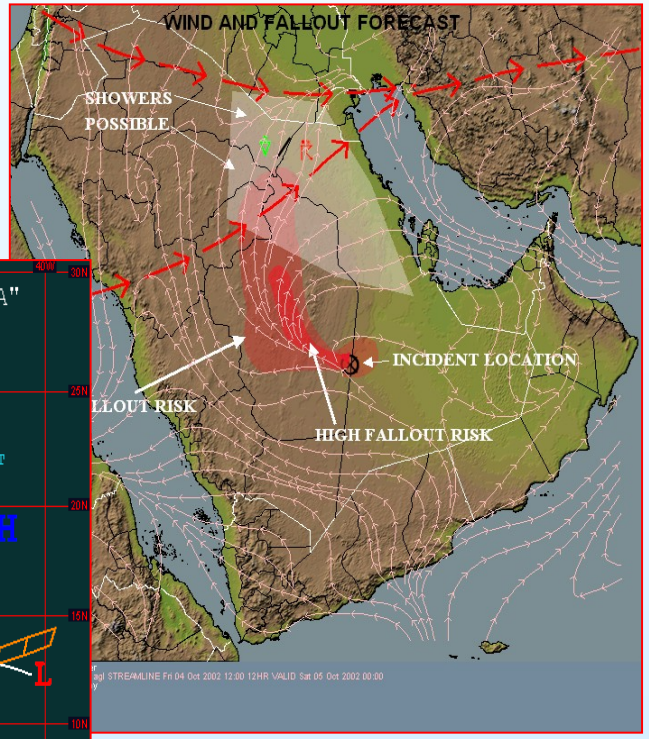
Products to Support Worldwide Military Operations (cont...)



200 mb Forecast Chart



Tropical Storm Track Chart



Fallout Depiction Chart

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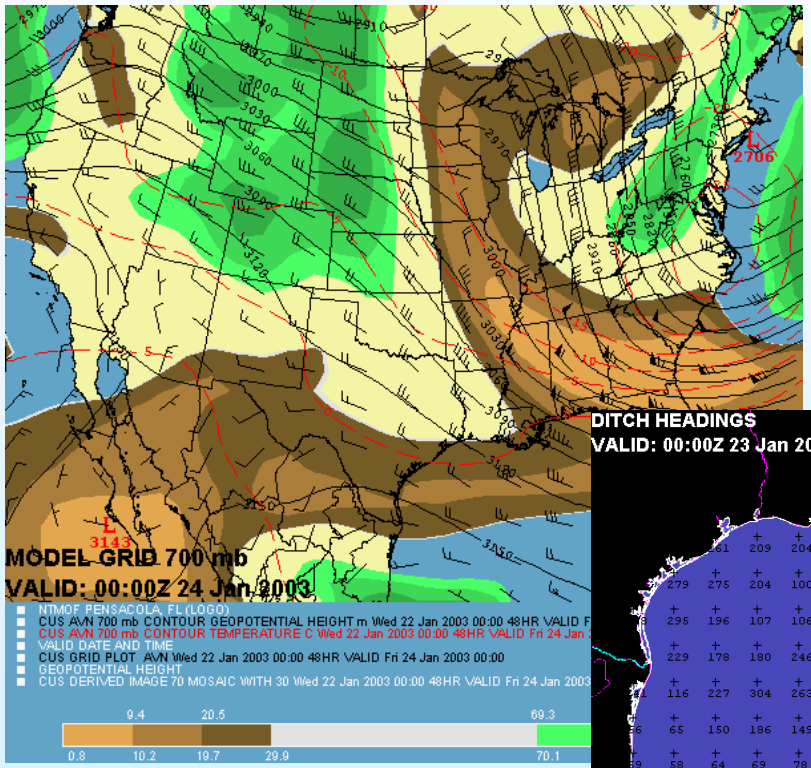
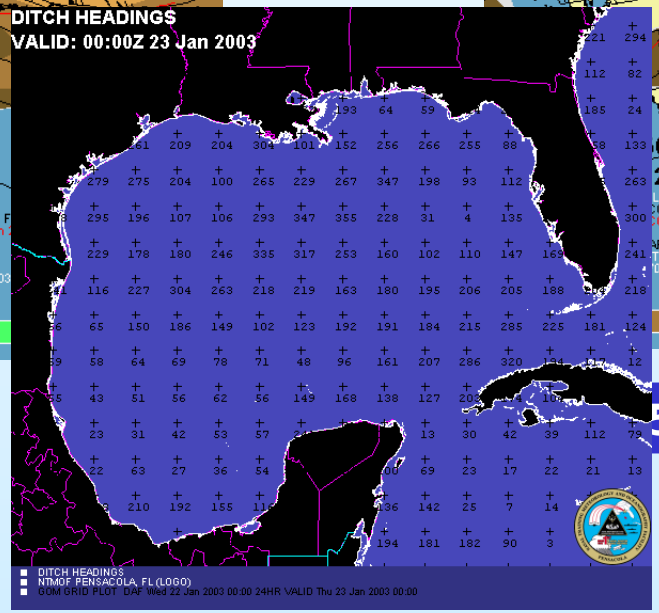
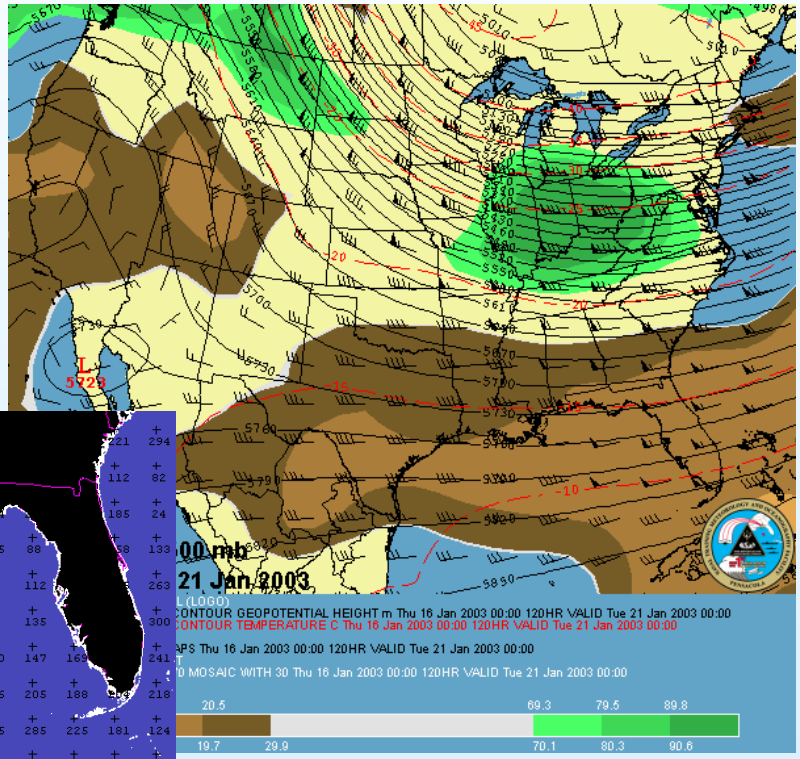
Products to Support Worldwide Military Operations (cont...)



700 mb AVN Fcst Chart



Ditch Headings Chart



500 mb NOGAPS Fcst Chart

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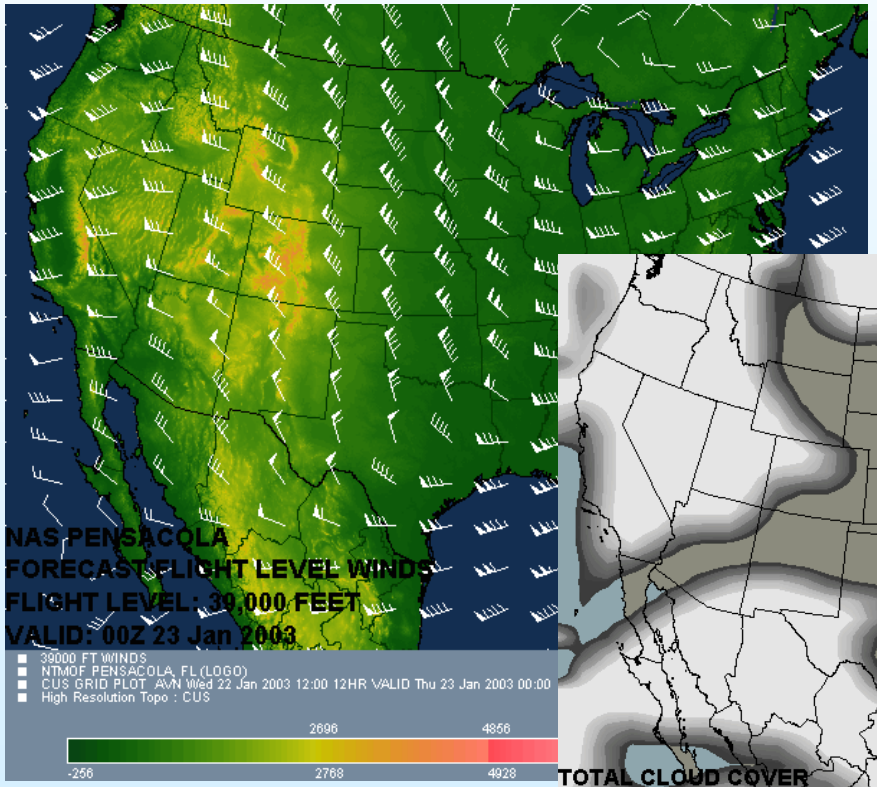
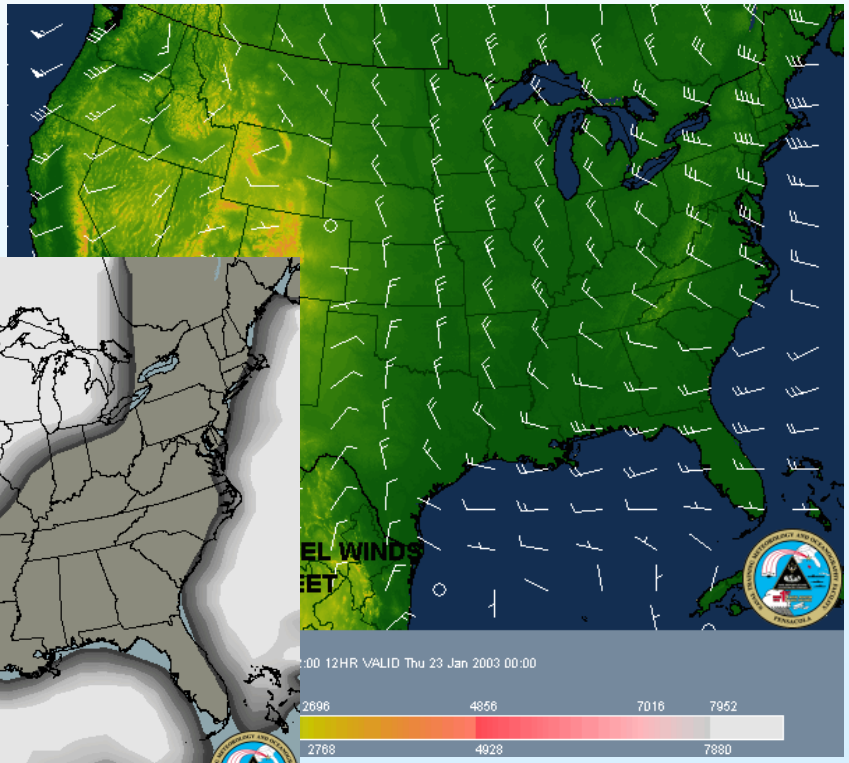
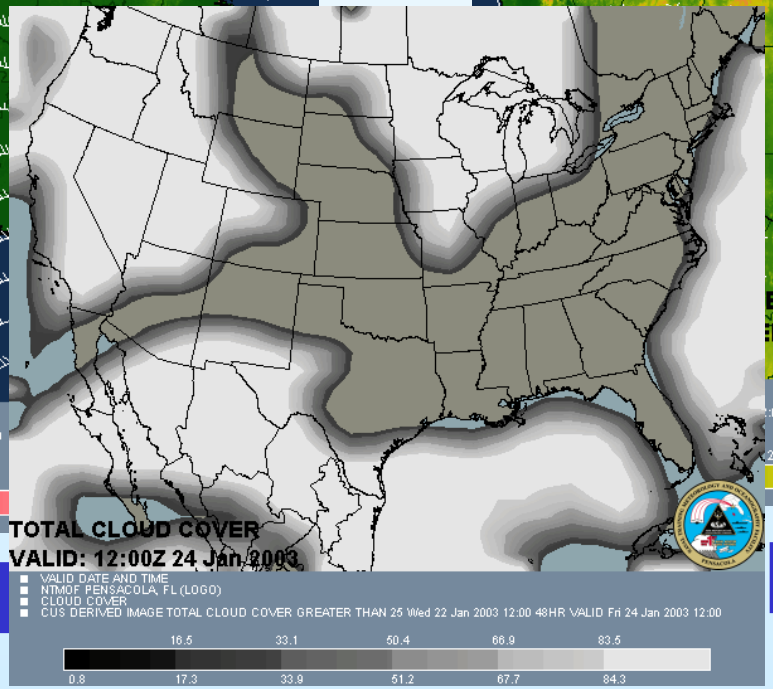
Products to Support Worldwide Military Operations (cont...)



39K Ft Wind Fcst Chart



5K Ft Wind Fcst Chart



Eta Total Cloud Cover Chart

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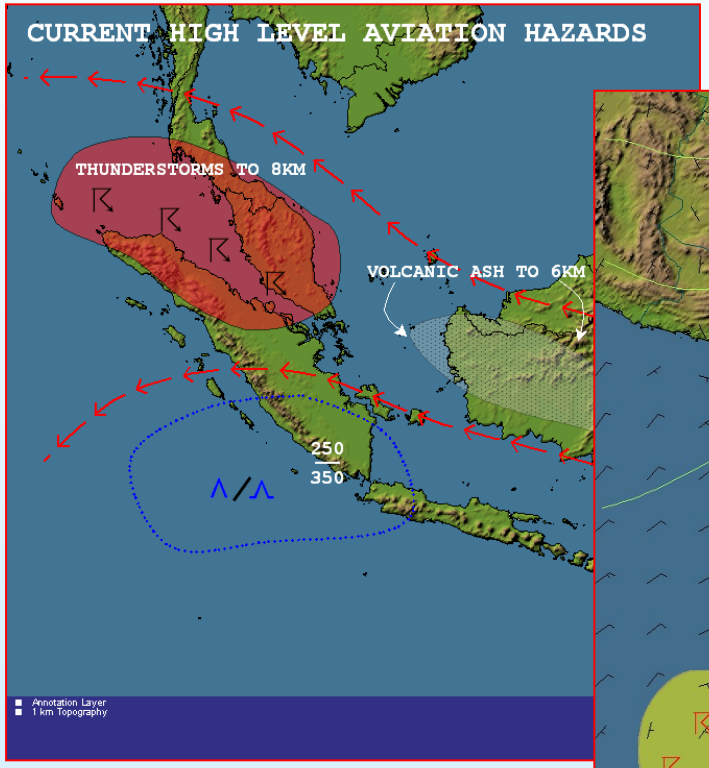
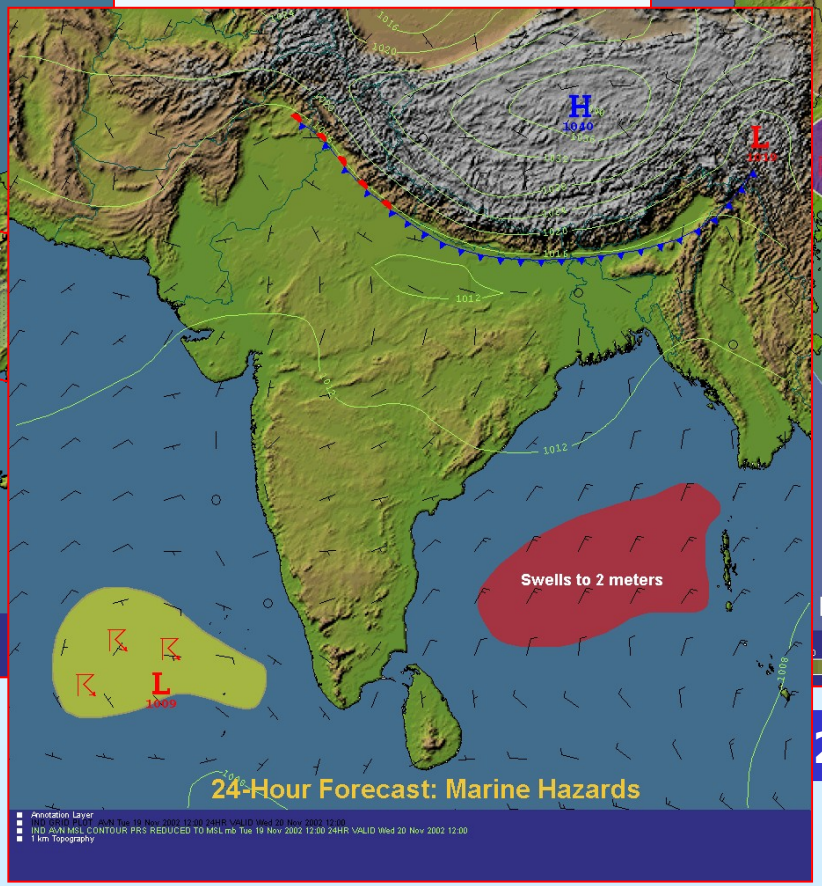
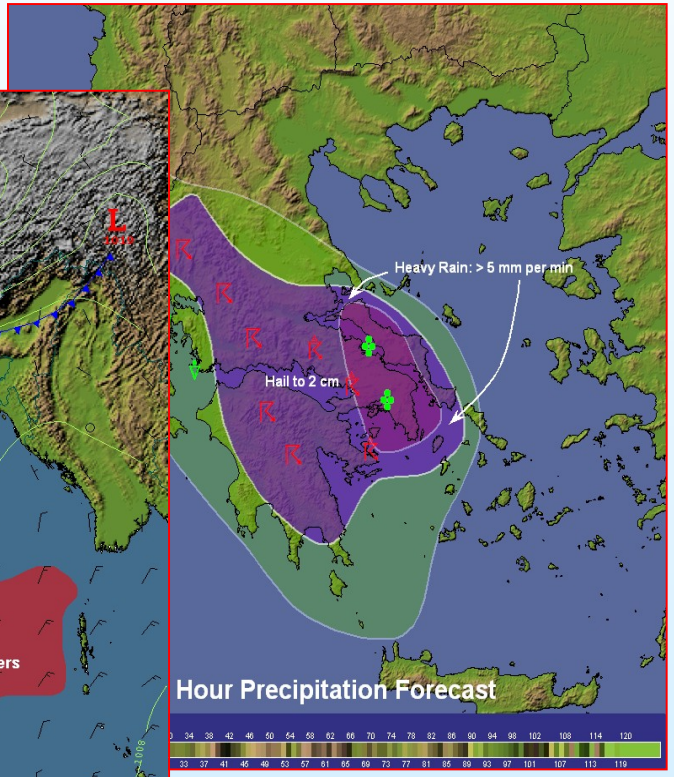
Products to Support Worldwide Military Operations (cont...)



Aviation Hazards Chart



24 Hour Marine Hazards Chart



24 Hour Precip Chart

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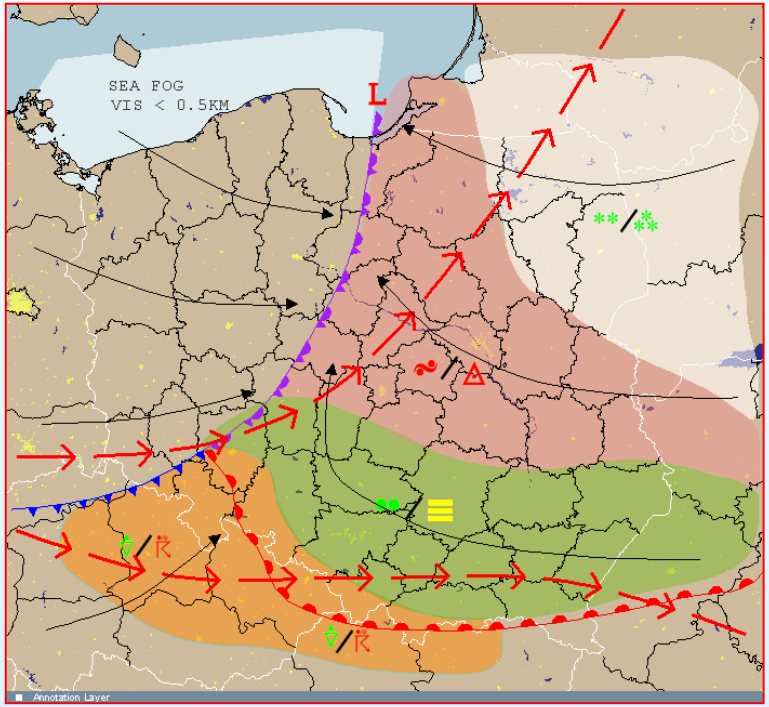
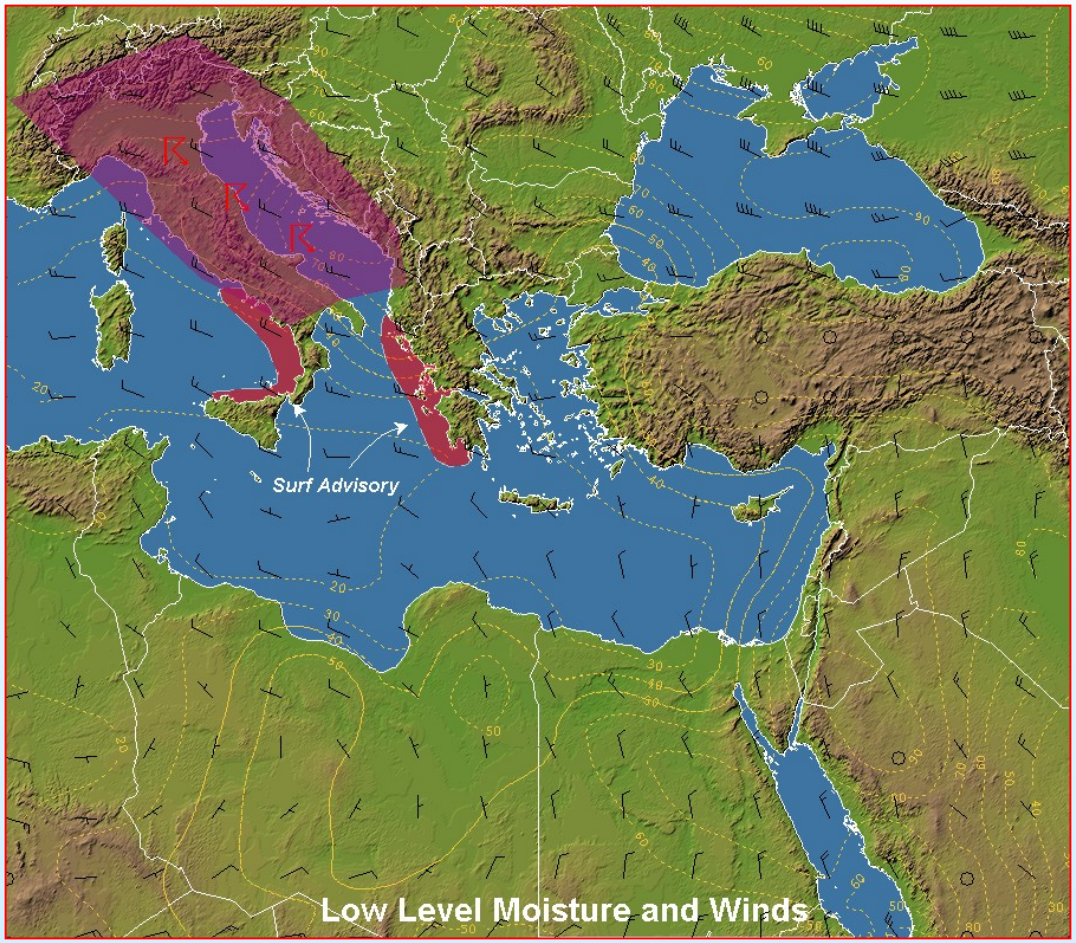
Products to Support Worldwide Military Operations (cont...)



Forecast Depiction Chart



Surface Forecast Chart

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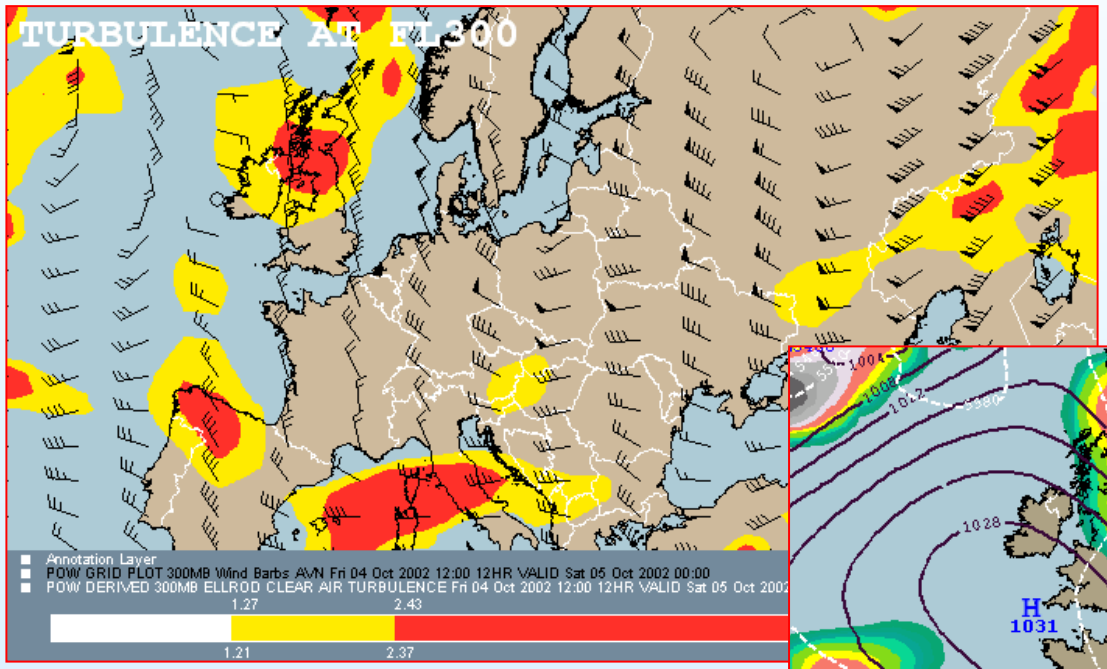
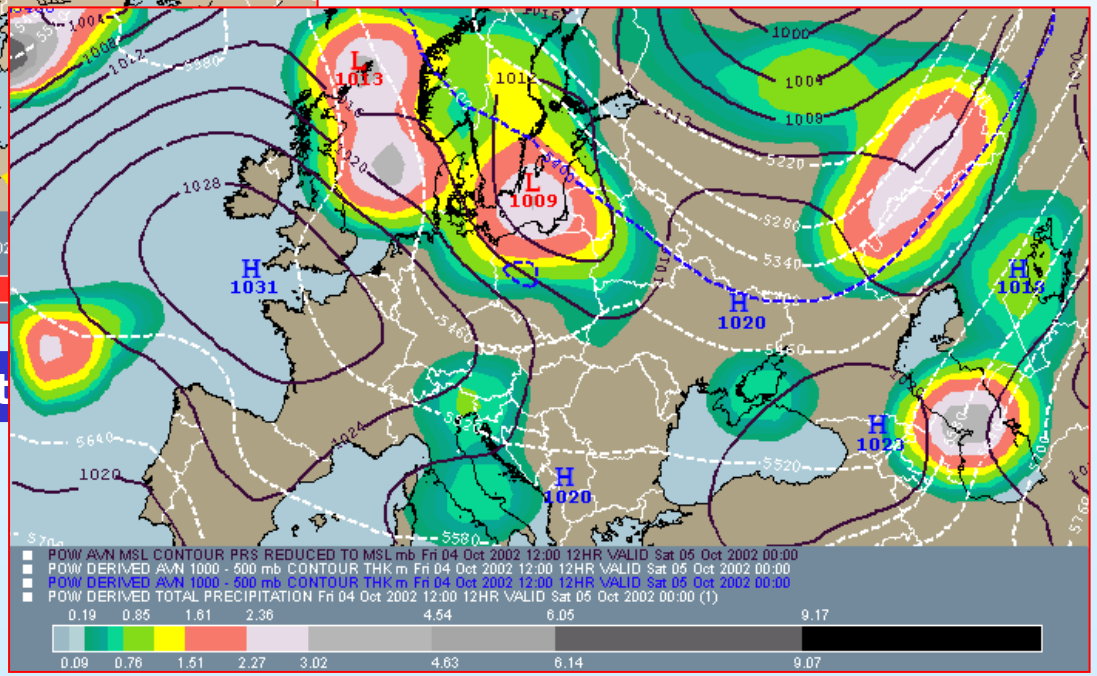
Products to Support Worldwide Military Operations (cont...)



300 mb Forecast Turbulence Chart



Forecast Precip / Surface Pressure / Thickness Cha

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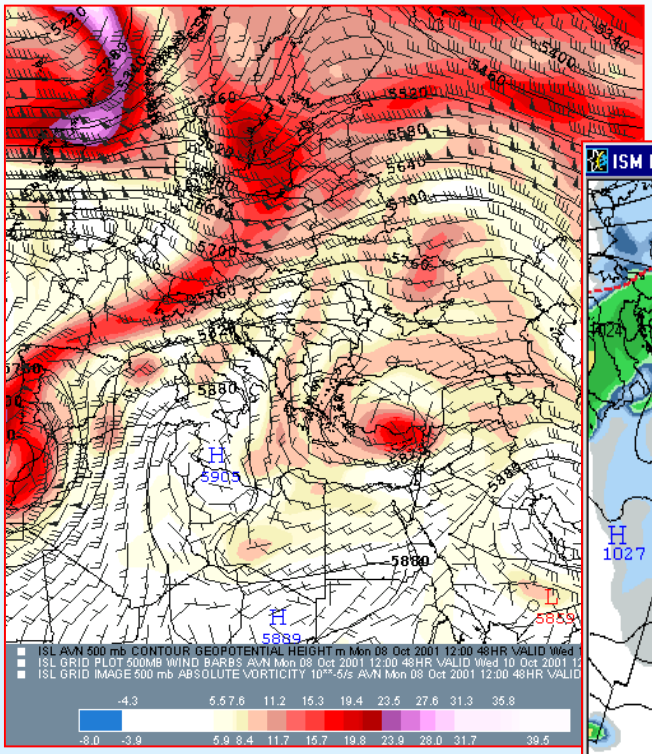
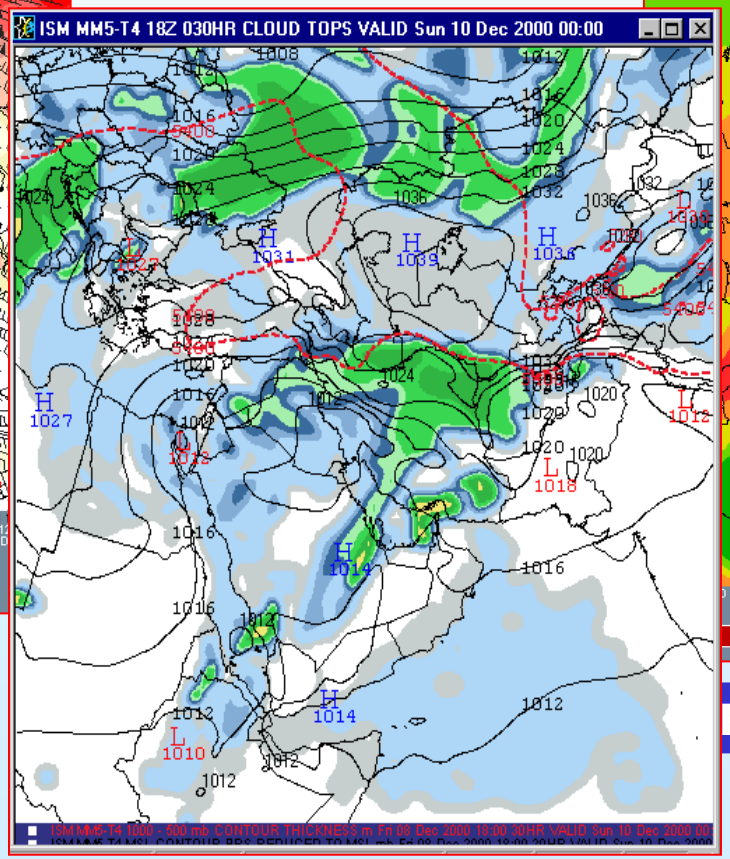
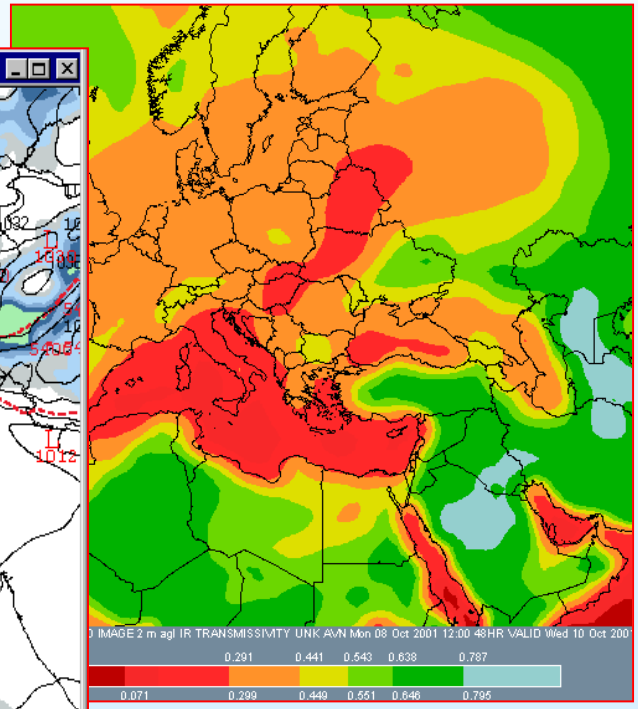
Products to Support Worldwide Military Operations (cont...)



500 mb Forecast Chart





R Transmissivity Chart

Forecast Clouds / Surface Pressure / Thickness Chart

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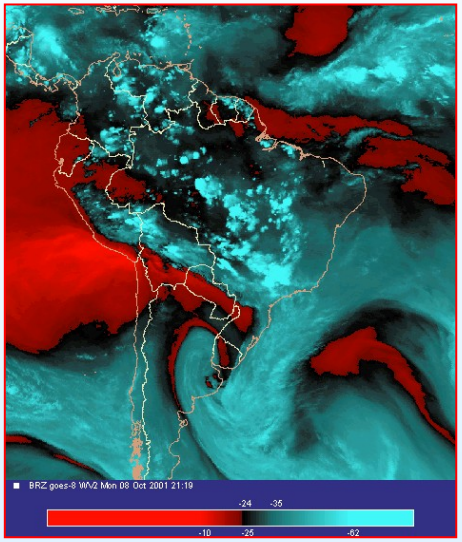
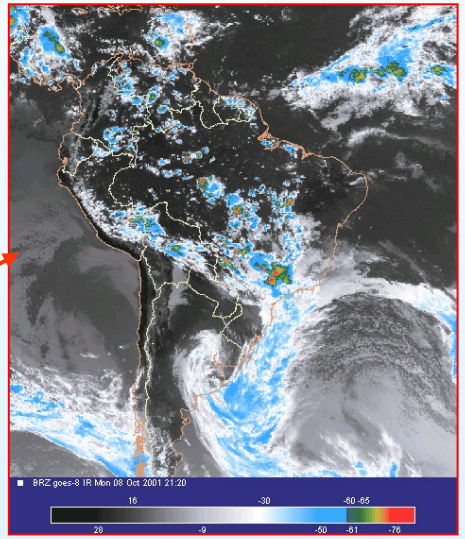
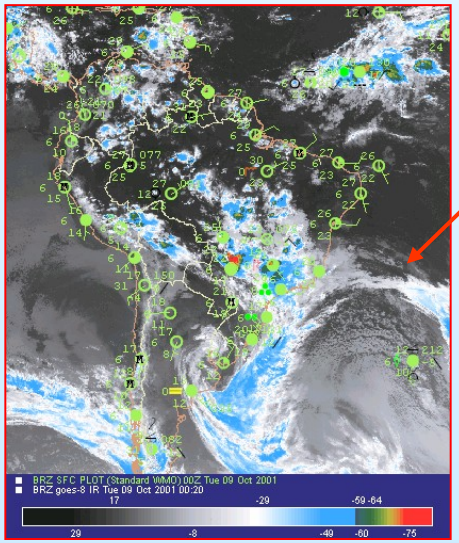
Products used by Power Companies



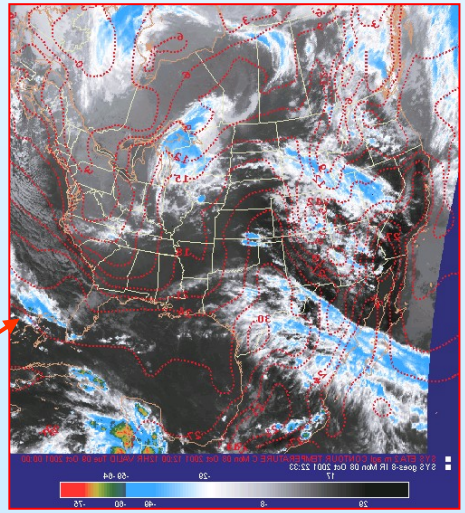
Enhanced water Vapor Image



Loop – Enhanced Infrared Image



Surface Map Overlaid onto A Visible Satellite Image



Surface Temperature Contours Overlaid onto A Satellite Image

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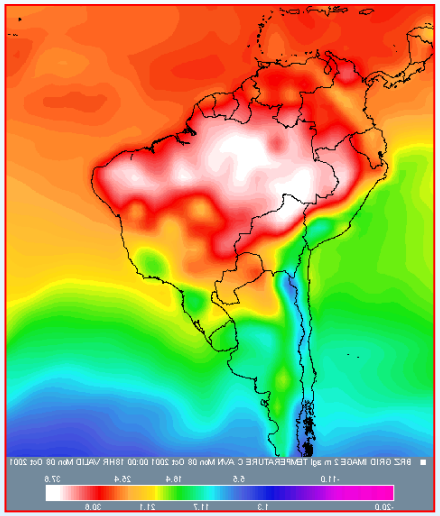
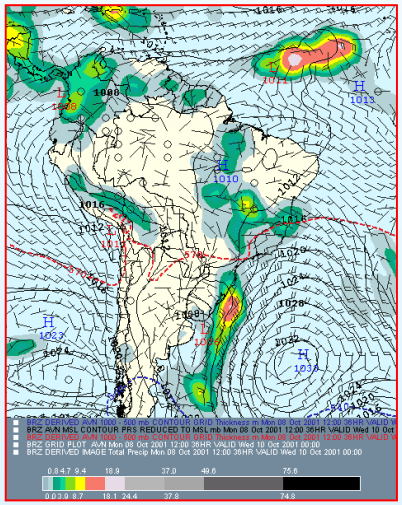
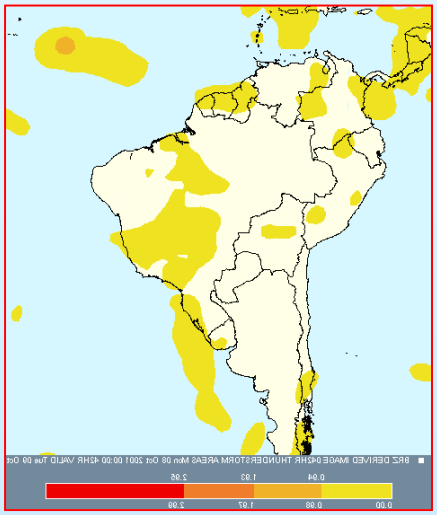
Products used by Power Companies



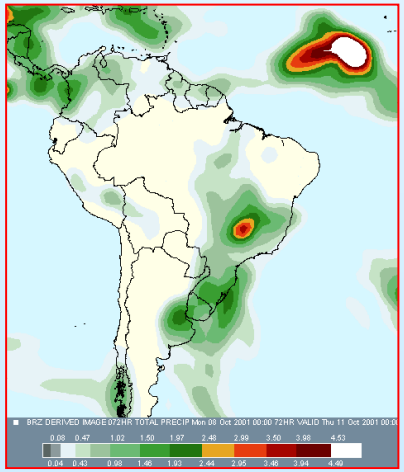
Forecast Surface Temperature Image



Loop – Precip and Wind Forecast Image



Surface Map with Forecast Thunderstorm Areas



Surface 72-Hour Precip Forecast Image

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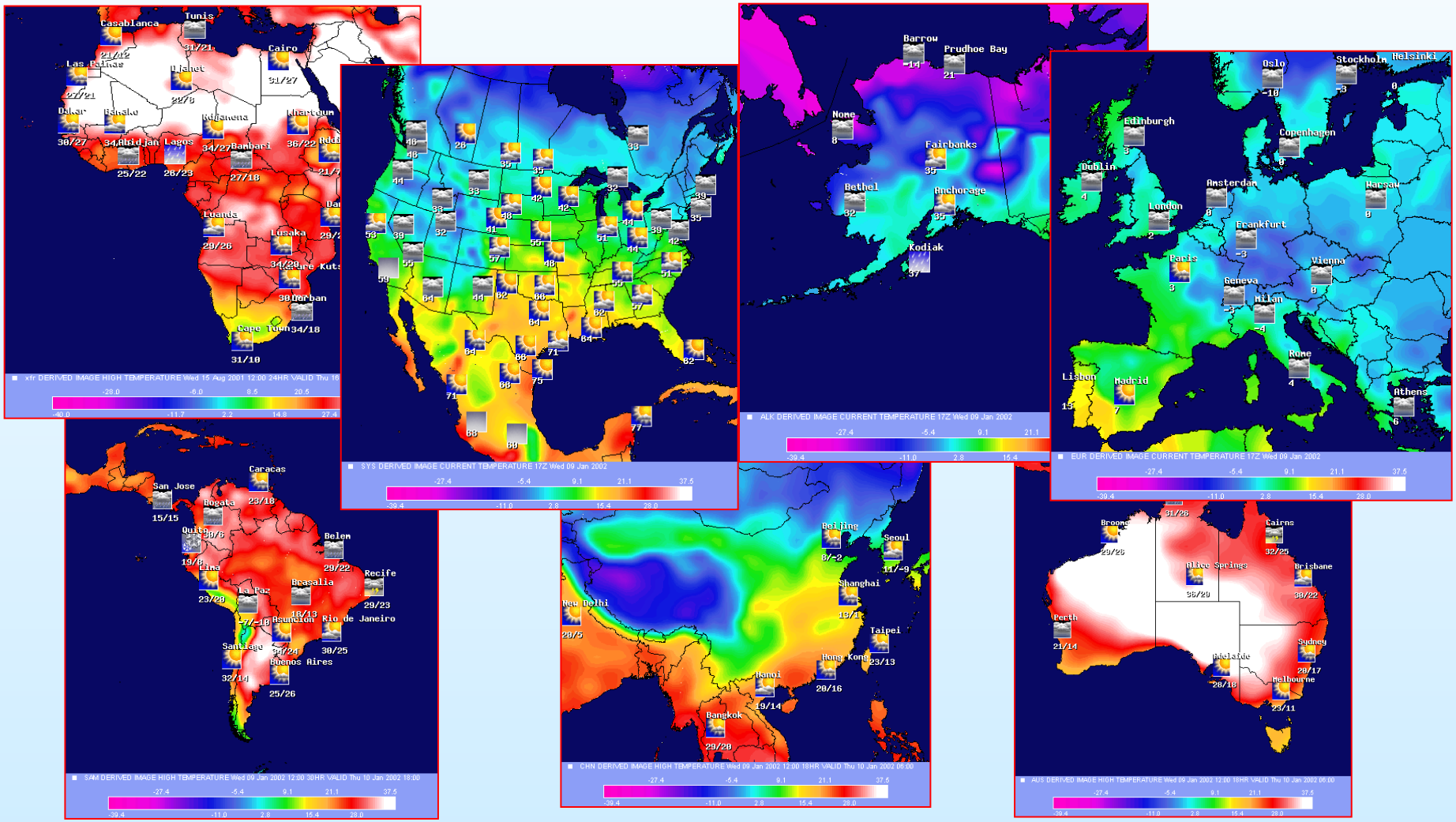
Products used for Commercial Forecasting



Weather Icons over Temperature Image

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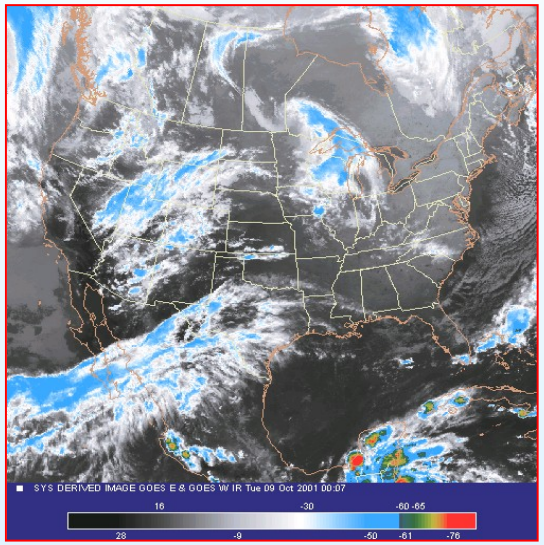
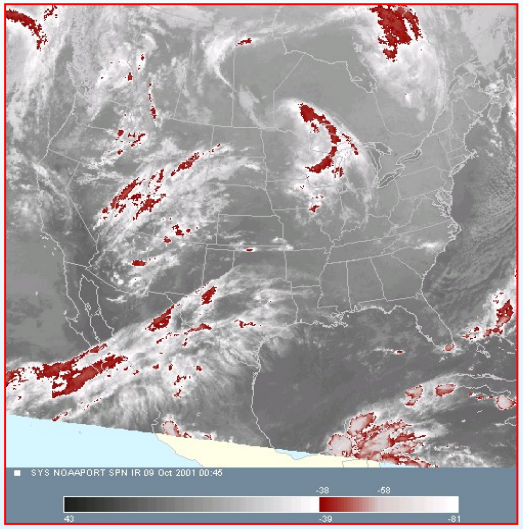
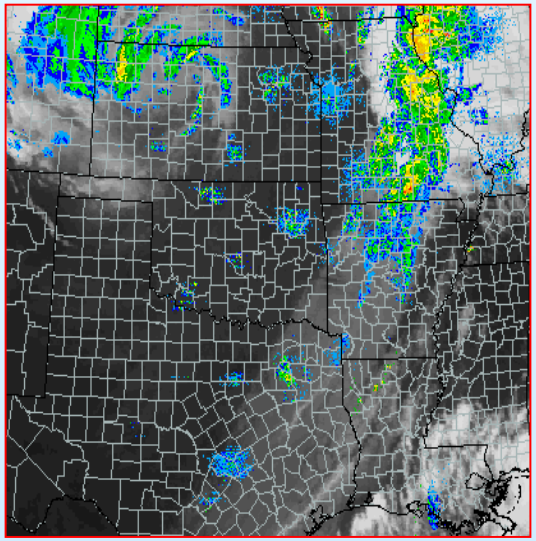
Products used for Commercial Forecasting (cont.)



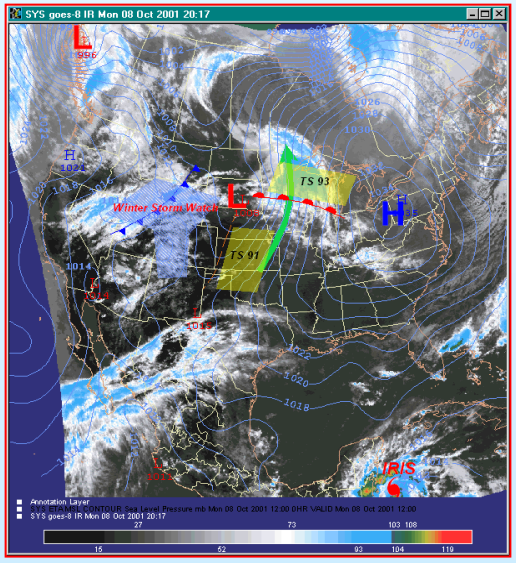
Color Enhanced Infrared Image



Loop – Enhanced Infrared Image



Composite Visible Satellite Image with Radar Base-Z Map



Annotated Infrared Image

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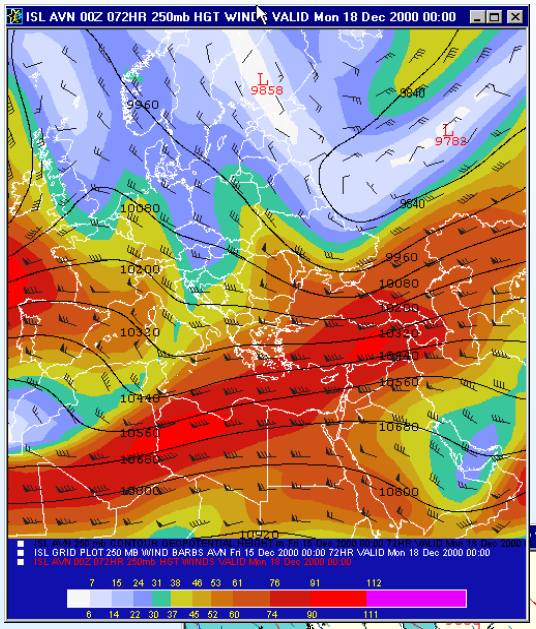
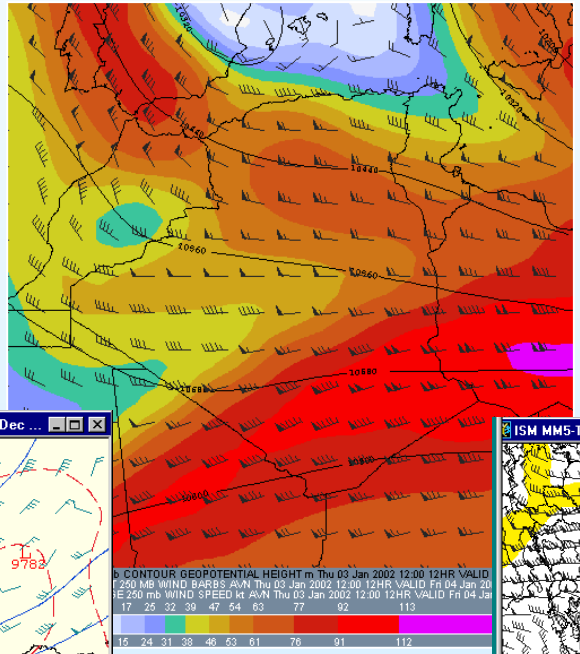
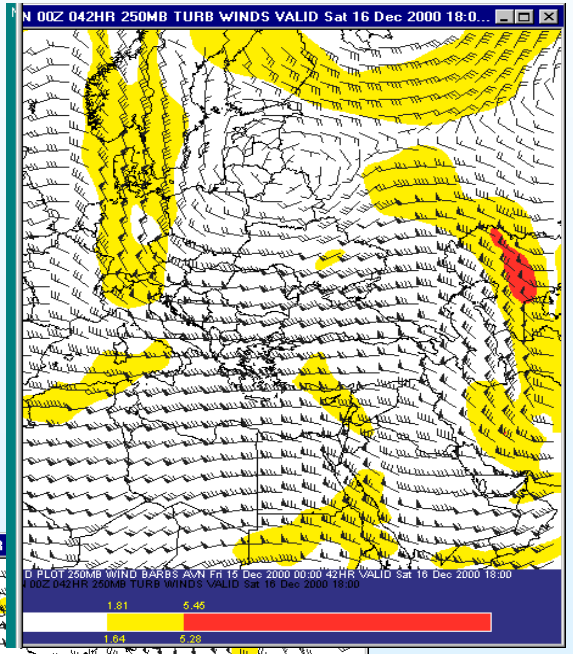
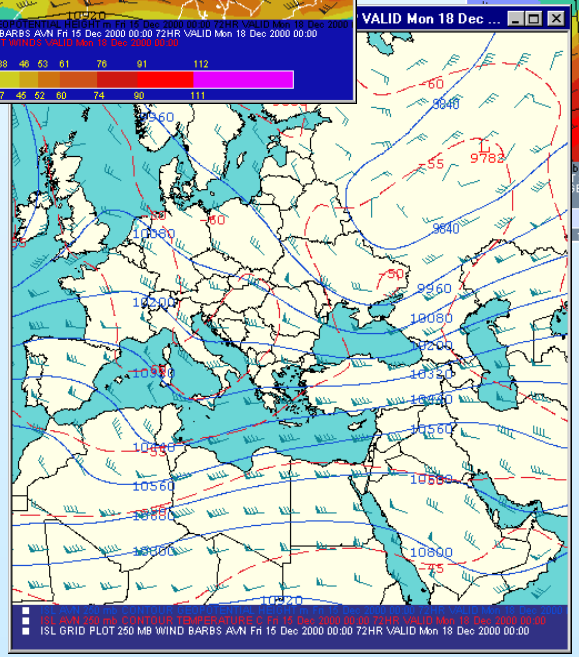
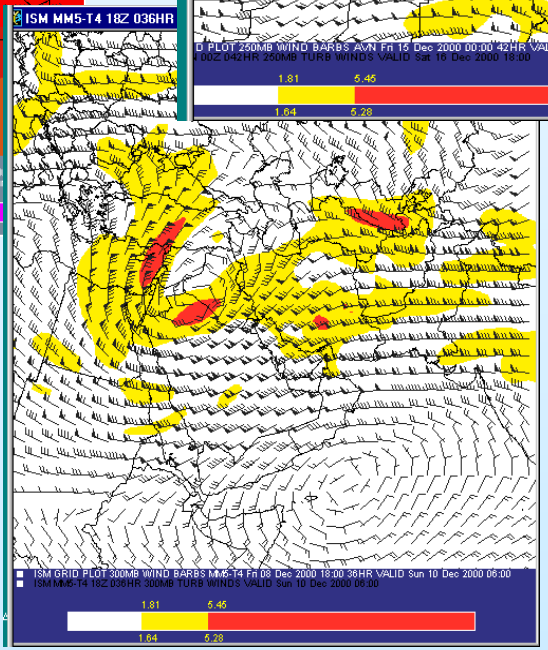
Data *Visualization* Examples











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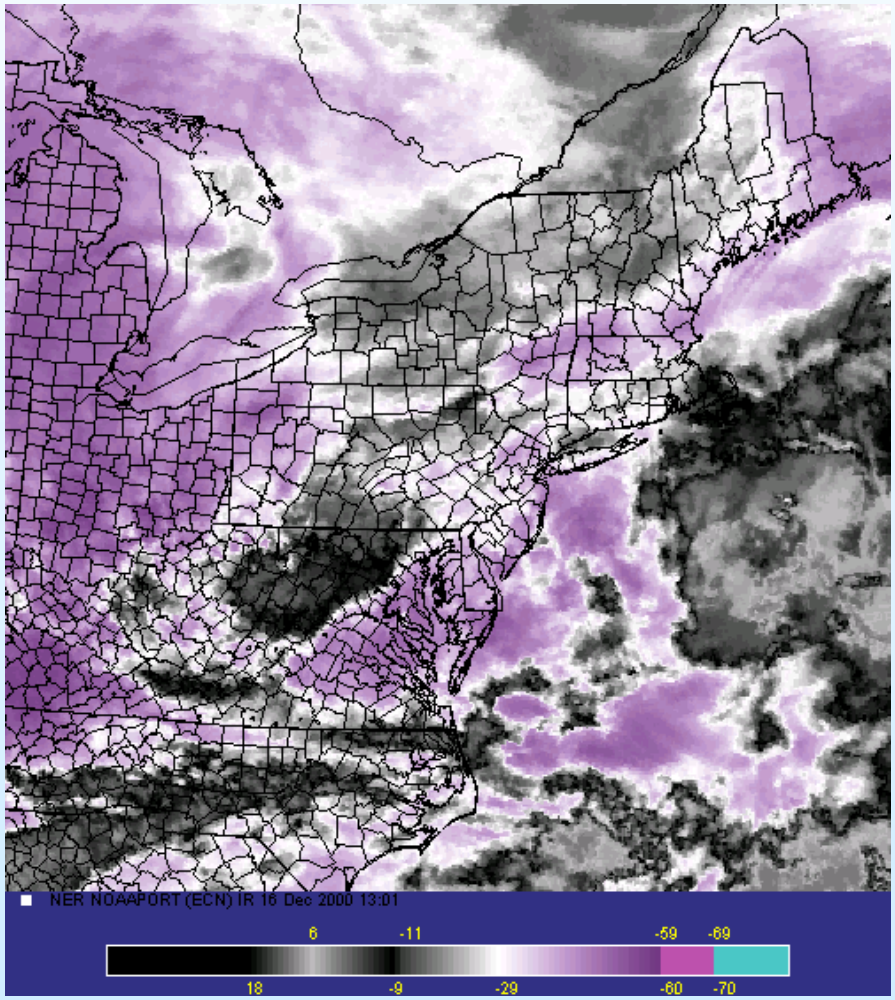
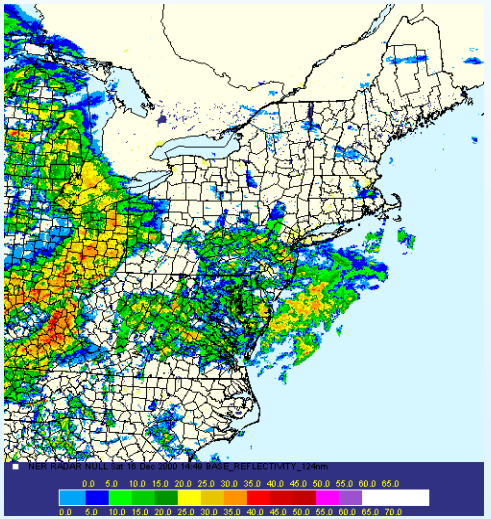
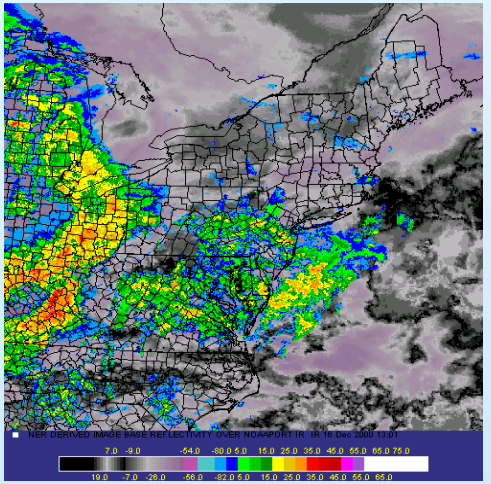
Data *Visualization Examples*

NE US IR Satellite Image



NE US IR Satellite Image With Radar Ove





IPS MeteoStar Inc.

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AUSTIN, TX
DAVID VAELLO (VP, ENVIR OPS)

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- PAUL SEEDS
- MARK CRAVEY
- ~~ERNESTO NORTE~~

GIL OCHOA (DIR OF INFORMATION TECHNOLOGY)
- DAN MONTELONGO

NANCY JOUPPI (DIR OF OPERATIONS)

BOB SCHEINHARTZ
- MARTY MINDNICH
- DAN MONTELONGO
- VINCE PIRRELLO
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- SCOTT ARCHER
- MARTY MINDNICH
- VINCE PIRRELLO
- BOB SCHEINHARTZ (CHIEF METEOROLOGIST)
- DAVE WILSON

WEB ENGINEERS
- SCOTT ARCHER (CHIEF WEB PRODUCTS)
- DAVID STROUD (CHIEF TCEQ WEB PRODUCTS)
- GIL OCHOA

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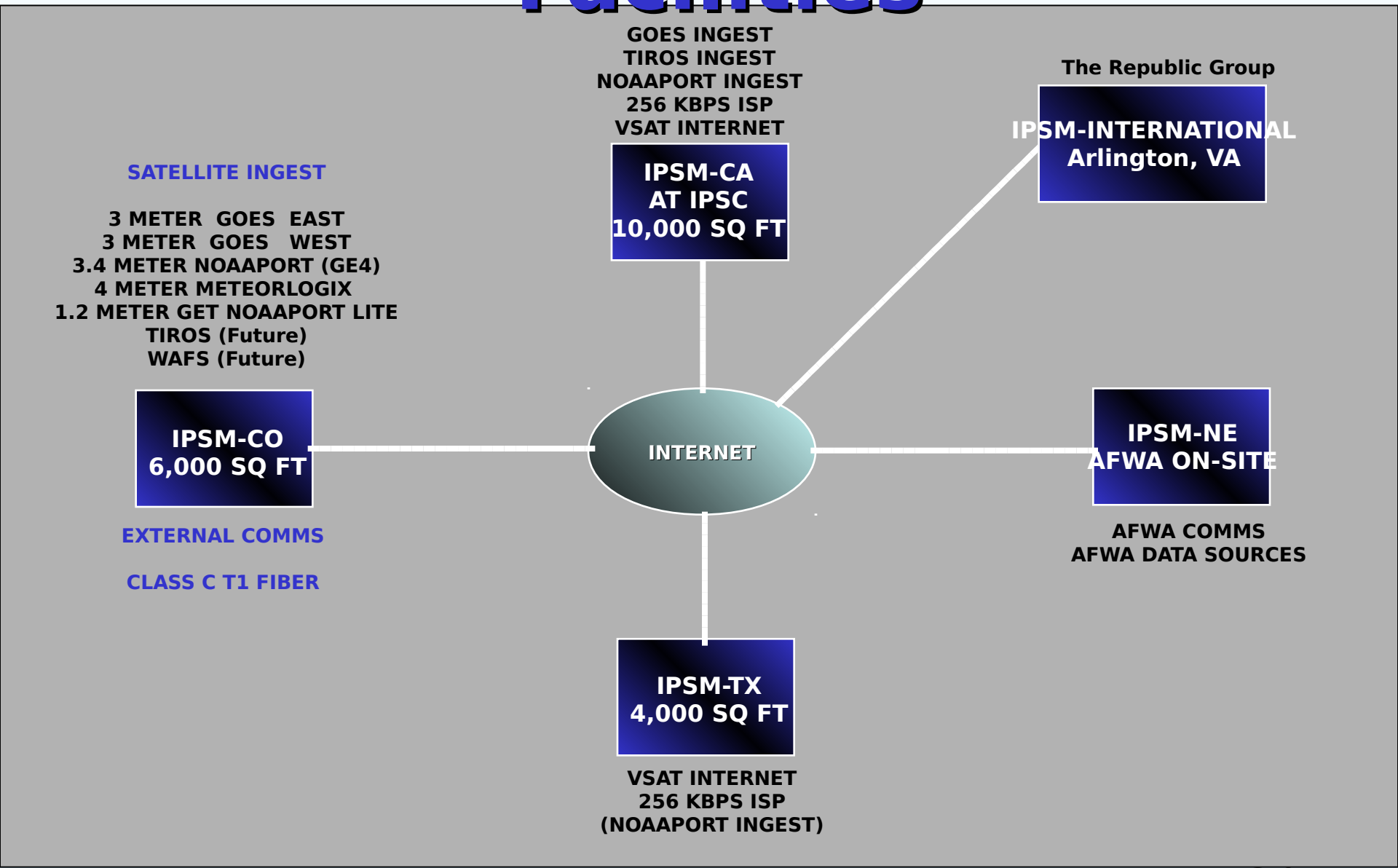
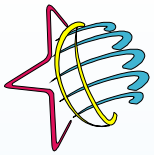
IPS MeteoStar Facilities





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IPS MeteoStar Products

Leading Environmental Analysis and Display System

(LEADS)

Meteorological Servers, Workstations, and Web Server

MeteoStar® ... The Weather Symbol Of Excellence

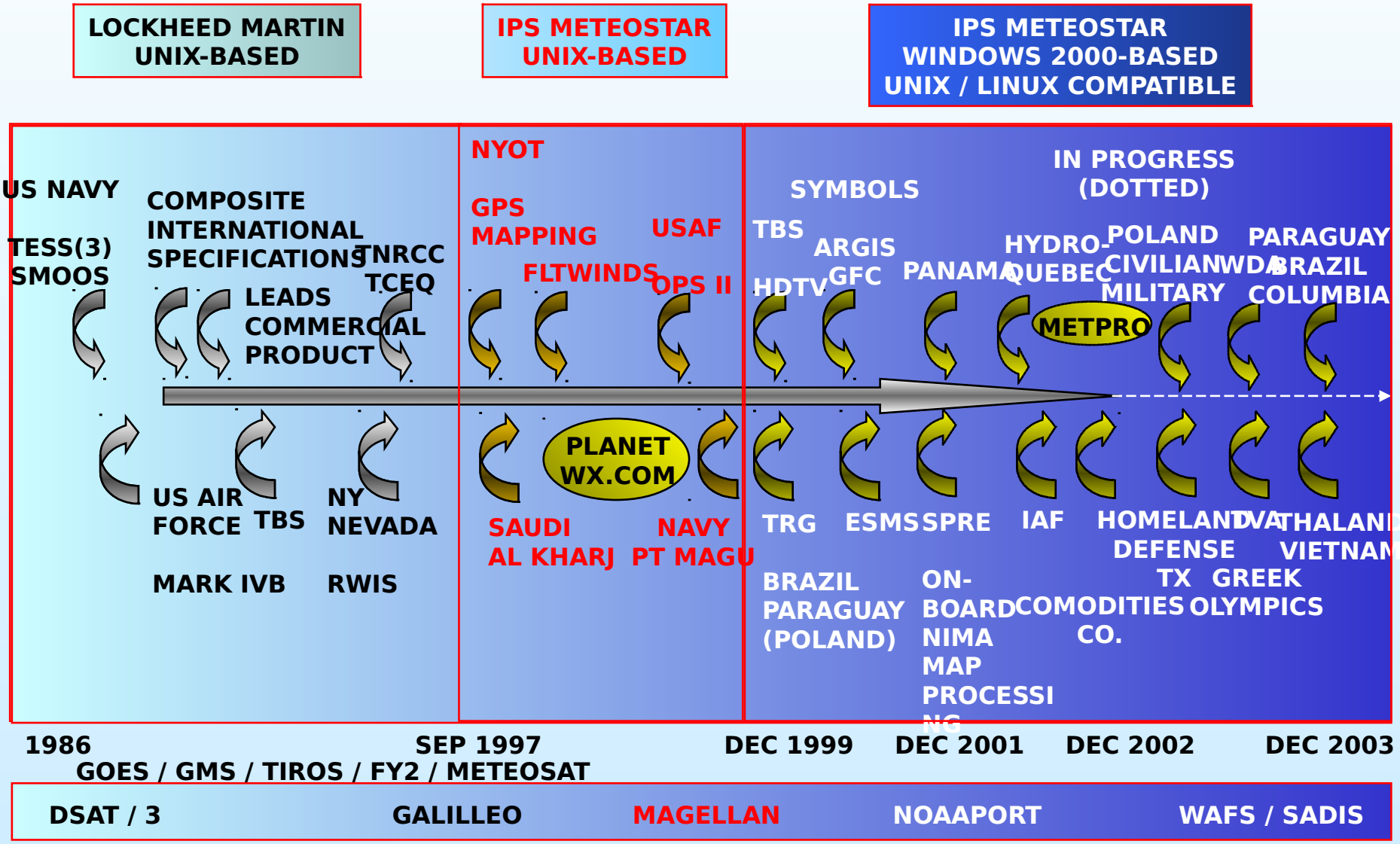
IPSM Applications – *What We Provide*

- Data Ingest
- Analysis
- Visualization
- Product Distribution

Complete DATA FUSION Solutions

MeteoStar® ... The Weather Symbol of Excellence

15 Years In Development
The LEADS Requirements History



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IPS MeteoStar

Systems Operational Around the World

MAJOR CLIENTS

- US Air Force / Navy
- US Industry and States
  - Texas Commission on Environmental Quality (TCEQ)
  - Georgia Forestry Commission
  - Wilkens Weather Technologies, Inc.
  - Commodity Broker
  - Lockheed Martin (FltWinds)
  - Texas Emergency Mgt Agency (Emergency Response Ctr) … soon
  - Tennessee Valley Authority … soon
- Israeli Air Force
- Polish Institute of Met and Water Mgt (& Military)
- Brazil / Paraguay (METSAT / LEADS

Ingest — Analyze — Visualize — Distribute

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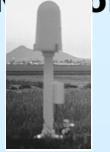
Profilers

Weather

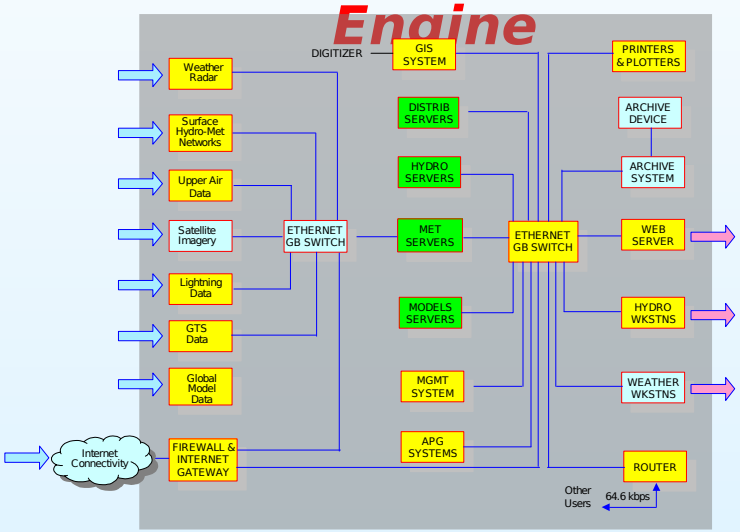
Surface



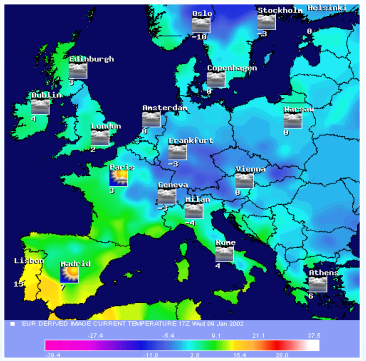
Lightning

Satellite Imagery

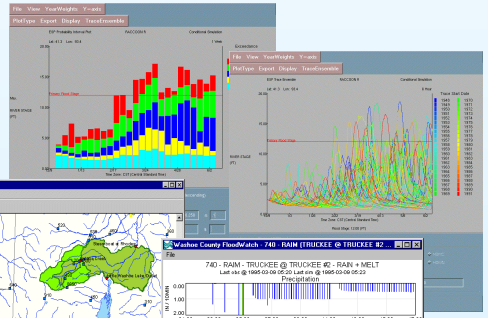
IPS LEADS Engine

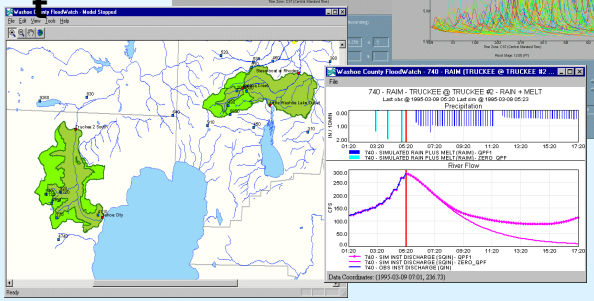


TV and Media

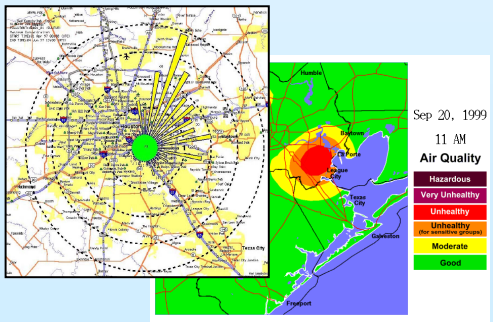


Flood Forecasting and Water Management

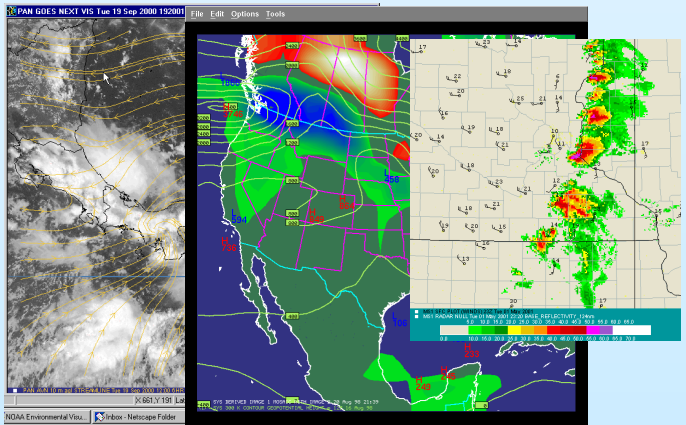




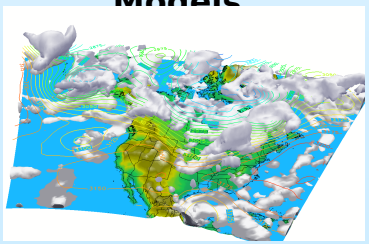
Air Quality Networks



Meteorological Analysis and Product Generation



Meteorological Forecast Models



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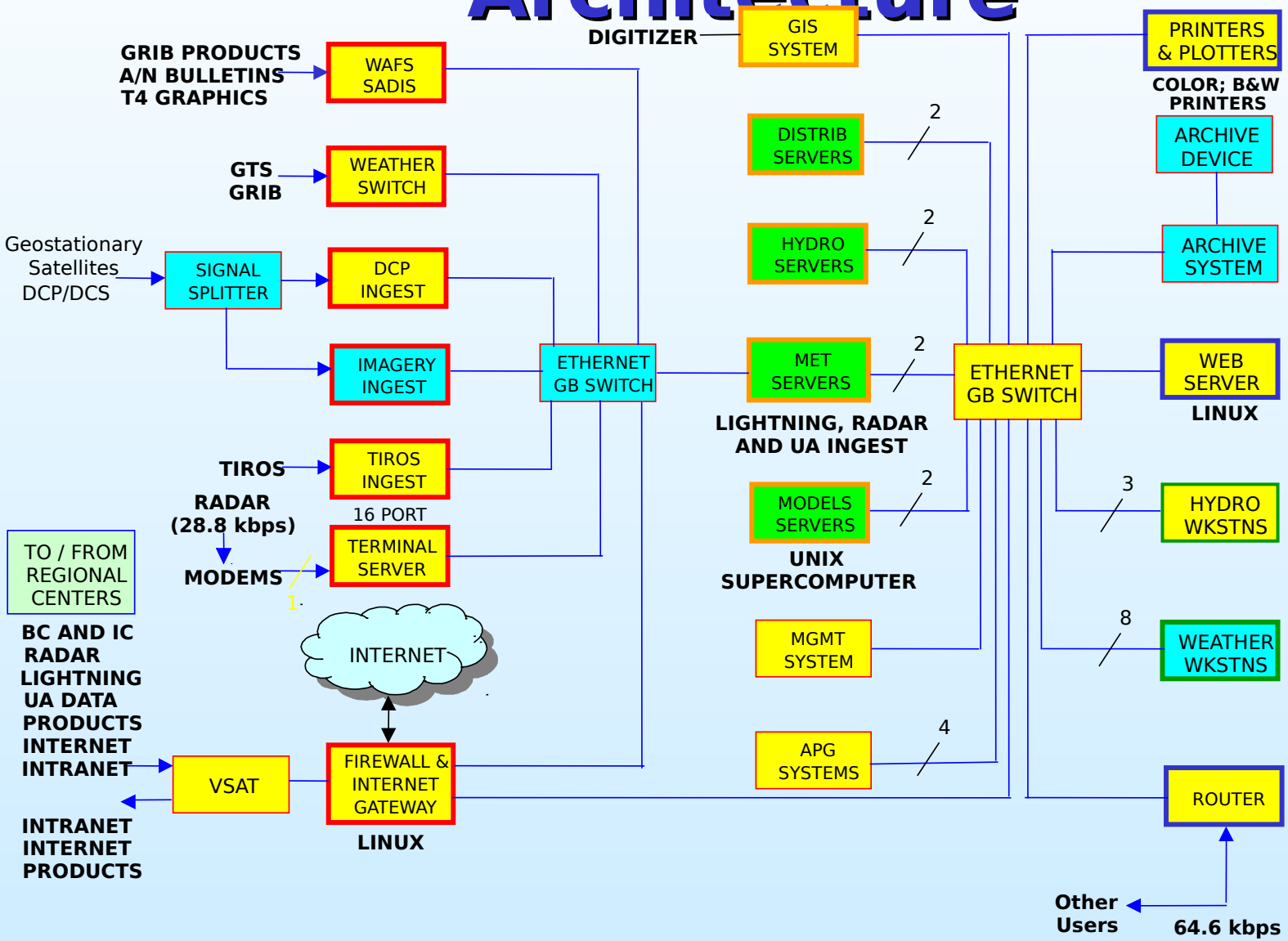
IPS MeteoStar Forecast Systems Architecture



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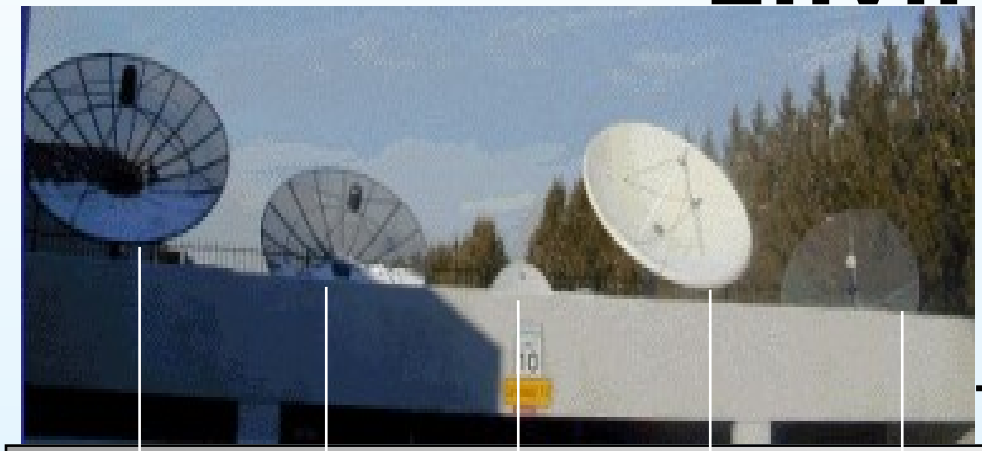
IPS MeteoStar Production System Environment



KAVOURAS
GOES EAST
DYNCORP NP LITE
NOAAPORT PLUS
GOES WEST
SWITCH
LEADS SERVER
LEADS SERVER
WEB SERVER
SWITCH
SPRINT T1 ROUTER
7
APG SYSTEMS

SOON TO ADD IN PARTNERSHIP WITH SSESCO AND SGI – SGI 24+ PROCESSOR O-2000 FOR REALTIME MESOSCALE MODELLING

EXTERNAL POWER
TRANSFER SWITCH
GENERATOR
115 VAC
UPS
208 VAC
MM5 MODELING
24-PROCESSOR SGI ORIGIN

SGI Origin & Storage

LEADS DELL Sever Rac

LEADS DELL Workstation

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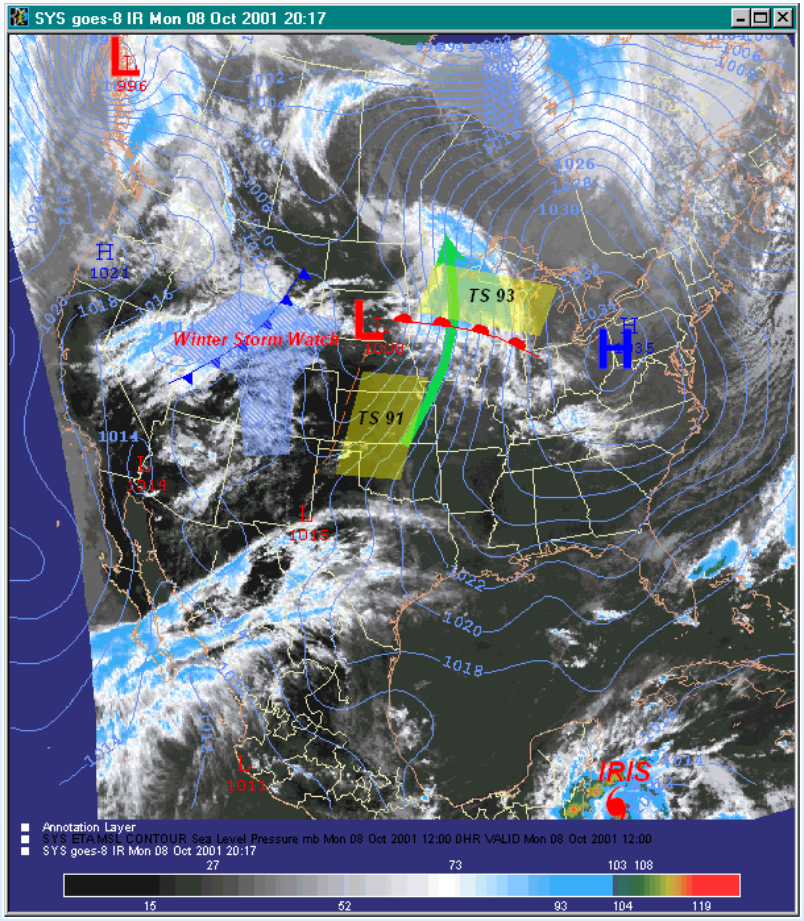
IPS *LEADS* Features

WMO OBS & GTS
- GRIB
- BUFR
- METAR & TAF
- BATHY
- MET Bulletins & MOS
- SIGMETS & AIRMETS

Most Weather WMO Data Types

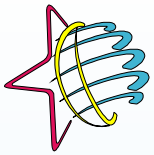
System-based Sensors
- Doppler Weather Radar
- Other Radar (e.g., TDWR)
- Satellite

Virtually Every Kind of Weather Sensor-



Easily Produce Complex, Informative Weather Charts

Meteorological Capabilities
- Automatic Product Building
- Message Switching
- Product Distribution
- Animation
- Map Mode Display
- Skew-T Log-P
- Cross Section
- Grid, Contour & Plot
- Grid / Image Calculators
- Manual Interaction
- Color Maps
- Custom Backgrounds
- METWATCH/Alerts
- Vorticity, Streamline, etc.
- Pan/Zoom
- Quality Control
- Many, many more



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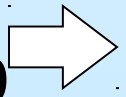
LEADS MODES OF OPERATION

- **Automated Mode (System Initiated Scripts)**
  - **Operational environment**
  - **Pre-generated products for rapid display/print**
- **Semi-Automated Mode (User Initiated Scripts)**
  - **Operational/research environment**
  - **User customized product generation for rapid display/print**
- **Interactive Mode (Extensive Flexibility)**
  - **Primarily research environment**
  - **Customized product generation**
  - **Some image processing applications**
  - **Record scripts for automated & semi-automated modes**



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Example *LEADS* Menus

SATELLITE
RADAR
GRIDS (INCL. MM5)
OBSERVATIONS
ETC.

LEADS INGEST & DECODE

LEADS INTERACTIVE TOOLS

DATABASE

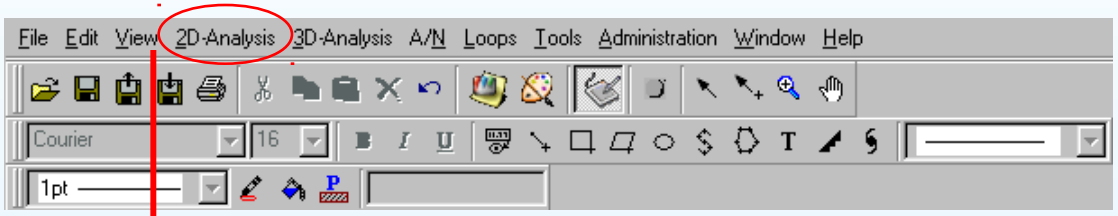
A RECORD OF EACH TOOL USED

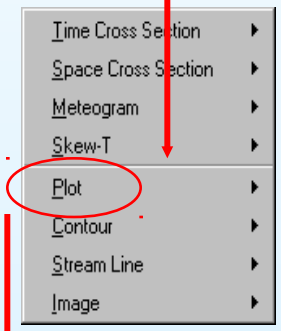
SCRIPTS

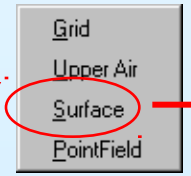
LEADS BKGRND SCRIPT EXECUTE

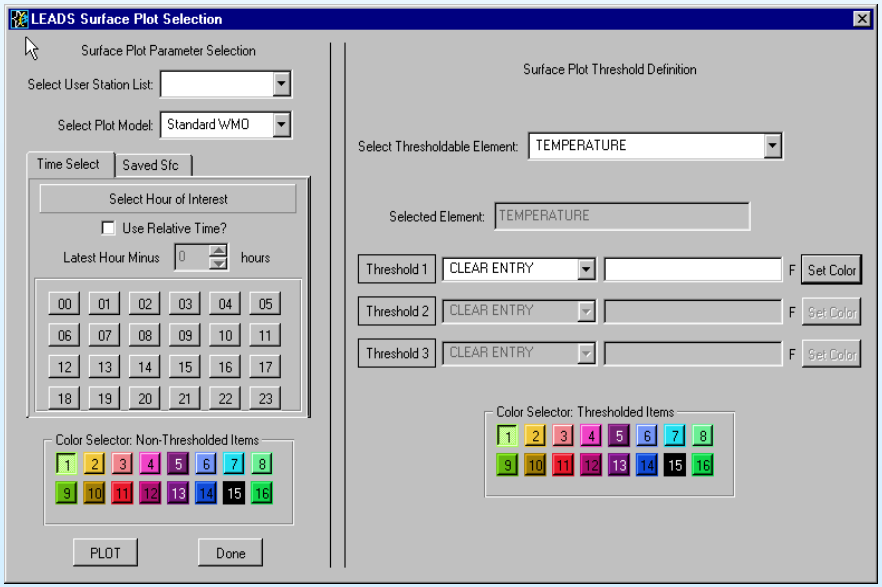
LEADS PRODUCTS

EXAMPLES FOLLOW









PLOT DISPLAY OVER CURRENT AREA OF INTEREST (AOI)

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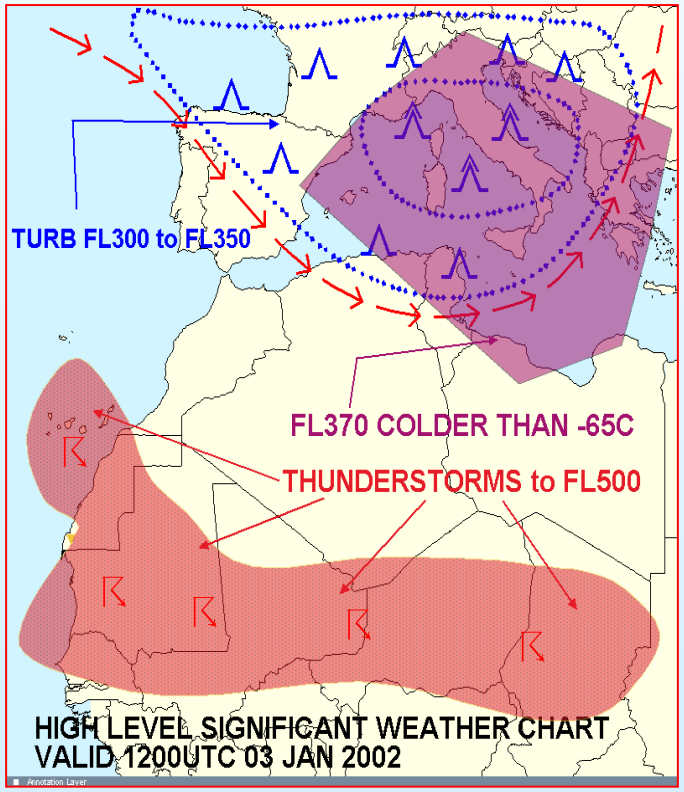
IPS *LEADS* New Features Continuous Product Growth

NEW FEATURES

- ✓ Composite Product Looper
- ✓ Map Mode - Edit Obs / TAFs
- ✓ Improved Drawing Tools
- ✓ Additional Graphics Colors
- ✓ Translucent Fill
- ✓ Shaded Topography
- ✓ Land / Sea Display Trimming
- ✓ Multiple Skew-T Traces
- ✓ Wind Barb Annotator / Editor
- ✓ Custom ICONS / Legends
- ✓ Script Global Vector Space
- ✓ Scriptable Range Rings & Lat / Lon Lists



THE LATEST NEW FEATURES

- ✓ Improved METWATCH / Alerts
- ✓ Enhanced Failover Capability
- ✓ Enhanced Web Server
- ✓ Tephigrams
- ✓ Composite Events Server
- ✓ Native Grid Handling
- ✓ Selective Grib Output
- ✓ Additional A / N Decoders
- ✓ Improved Map Server
- ✓ Improved EWB Interface
- ✓ C2 Export Files (SHAPE, GEOTIFF, and NITF)

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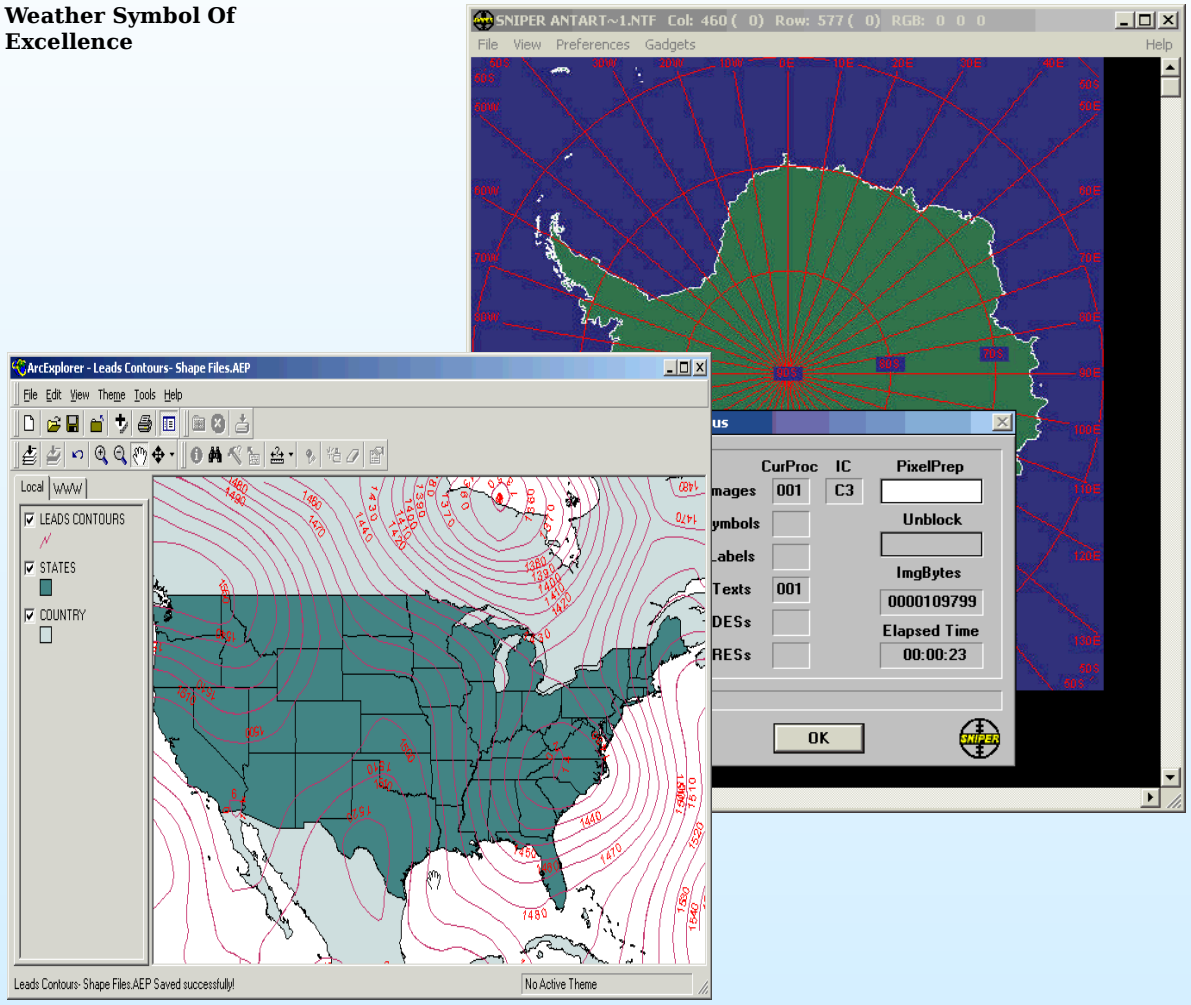
Continuous Growth -- New Features Soon



Sample SHAPE and NITF File Export from LEADS Displayed on ESRI ArcExplorer and SNIPER

NEAR FUTURE

- ✓ Archive / Restore Capability
- ✓ Tropical Storm Tracking Display
- ✓ Improved Web Export Capabilities, including Text
- ✓ Graphical Display of PIREPs, AIREPS, SIGMETS, & WWs
- ✓ Add NIMA DAFIF Data
- ✓ Improved Color Map Builder / AOI Selection Categories
- ✓ Improve Skew-T, Add Stuve
- ✓ Improved Loop Interface, Add Product Legends
- ✓ On-line Help
- ✓ MetPro Functions:
  - ✓ Satellite Analysis
  - ✓ Tropical Storm Devorak
  - ✓ Cloud Type and Amounts
- ✓ AFWA WDA:

IPS *LEADS* New Features

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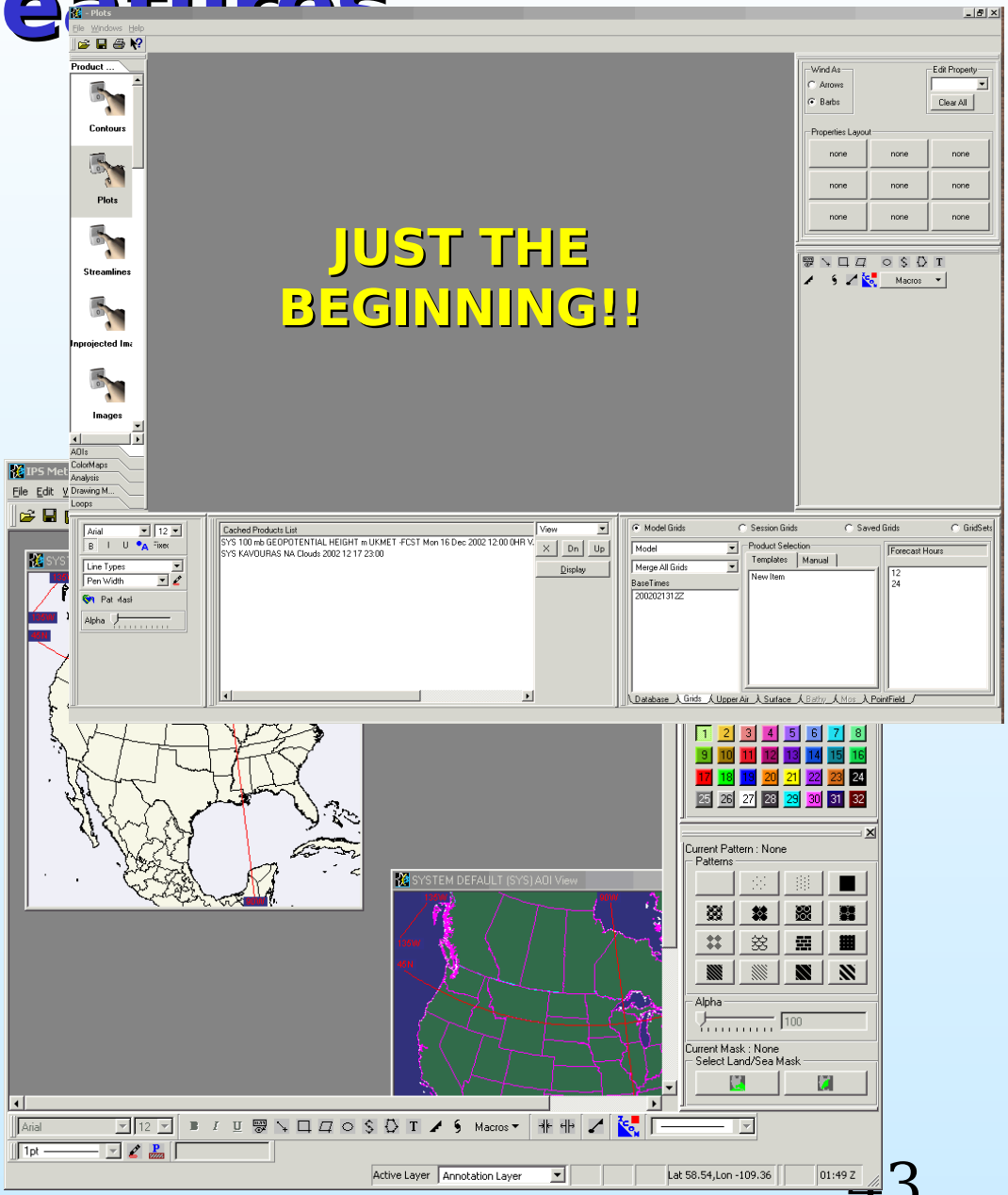
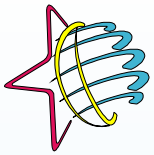
LEADS Portal

- ✓ Rapid, Easy Interface to Analyze Data and View Products … Web Look and Feel
- ✓ Portal Defines Work Area … Products Selected with Web Viewer Look and Feel Interface
- ✓ Rapid Generation of AOIs
- ✓ Automatic, On-The-Fly Product Generation and Export to Web
- ✓ One Click Access to User-Defined Product Loops
- ✓ Easy to Stop Product Loops and Annotate with Forecast for Export to Database and Web
- ✓ Rapid Scripting…Save Script for Products on the Fly… Schedule New Product Generation as Part of Rapid Script Interface
- ✓ Requesting Customer Inputs to Make Portal Even More User Friendly and Powerful!!





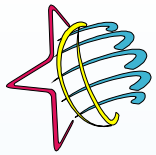
MeteoStar® ... The Weather Symbol Of Excellence

LEADS Windows 2000 and NT Based Systems*

- Hardware
- Software
- Support

For operational and research meteorology

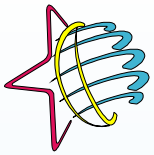
***UNIX and LINUX Systems also Available**



MeteoStar® ... The Weather Symbol Of Excellence

LEADS Hardware / Software Features

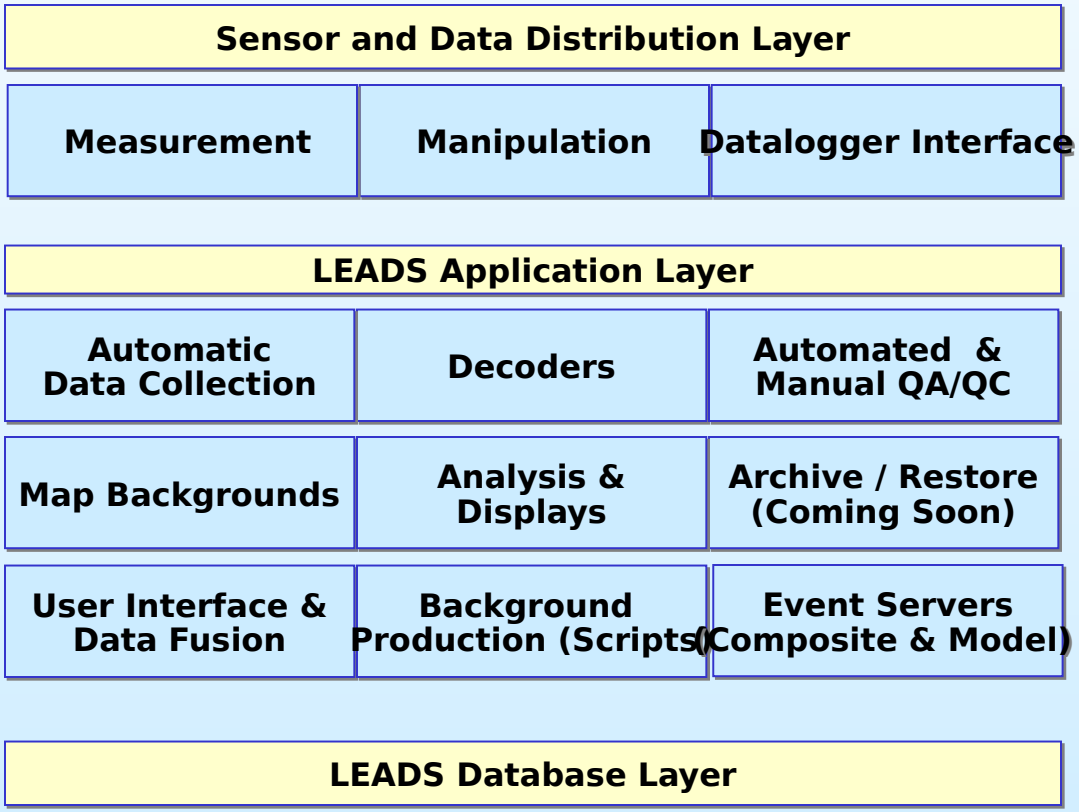
- Use of Standards
  - Platform Independent QT
  - TCP/IP
- Portable Applications for Hardware
  - 95% of code hardware independent
  - -- UNIX/LINUX/Windows Versions use Same Source Code
- State-of-the-Art Software Design
  - Modular design
  - Applications/algorithms easily added/modified
  - Distributed processing capability
- Structured Languages
  - C++ (75%)
  - C
  - PERL
- Structured Database Schema
- Comprehensive Easy to Use Users



MeteoStar® ... The Weather Symbol Of Excellence

Modular LEADS Software

Software in Modules to Allow Maximum Reuse & Flexibilit



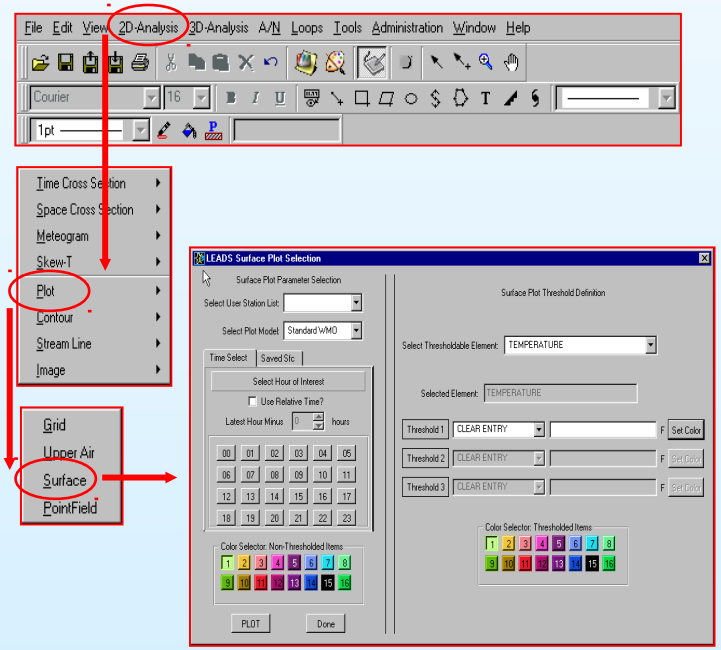
- ✓Sensors Measure Data and Provide Digital or Analogue Signals to Datalogger for Distribution to LEADS Server
- ✓LEADS Application Layer Automatically Collects, Decodes, Quality Controls, and Stores/ Archives Data in Database Layer
- ✓LEADS Automatically and Manually Fuses Data in Displays with Map Backgrounds for Local Use and from a Web Server
- ✓LEADS Database Layer Provides Data for Application Layer

MeteoStar® ... The Weather Symbol Of Excellence

LEADS Logistics Support

Software Development and Maintenance

- Highly Qualified Software Engineers with Customer-First Focus
- Platform Independent Software (Linux, UNIX, HP-UX, SUN Solaris, IRIX, NT, W2000)
- Requirements and Design Review Processes
- Customer Involvement in Reviews
- Spiral Software Development Process
- Configuration Management Process and Supporting Tools
- Structured Test Environment
- Rapid Response to Software Issues
- Enhancements / Upgrades on a 3-6 Month Schedule
- Responsive Customer Support



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LEADS Logistics Support
Integration, Installation, and Training

- Integration, Installation and Training to Meet Customer's Needs
- Robust System & Regression Testing Using Robust Data Feeds
- Customer Systems & Data Feeds used for LEADS Factory Acceptance Tests
- IPSM Will Support On-Site Acceptance Tests at Customer Site
- Installation Training Provided by IPSM to Allow Customer to Take Full Advantage of LEADS Automated Installation Capabilities
- IPSM Will Provide Affordable On-Site Support for Program Growth and Evolution … Want Long Term Relationship with Customer
- Help Line … IPSM Provides Normal Duty Hours On-Call Support
- IPSM Provides Straight-Forward User Training

IPSM Firmly Committed to Follow-On Support Since it is Critical to Program Success

MeteoStar® … The Weather Symbol Of Excellence

What Makes LEADS & IPSM The Best Value

LEADS:

- ✓ Provides Powerful Automated Production Capability (Scripts); Operational – 7 X 24
- ✓ Ingests Most Meteorological Data Types (Including NOAAPort, METCAST and WISP)
- ✓ Runs Under Windows 2000; Cross-Compilable Under Linux & Unix
- ✓ Undergoing Continuous Improvement … LEADS Portal & Other Initiatives
- ✓ Provides Hundreds of Meteorological Functions; Oceanographic Functions Can Be Added as Needed; Automated METWATCH
- ✓ Sold under an Affordable Enterprise Licensing Arrangement to Support Large Customers … Soon LEADS Product Suite will be on GSA Schedule
- ✓ IPSM Committed to Substantial and Continuing Investment in Product Enhancements!

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What Makes LEADS & IPSM The Best Value (Cont)

IPSM:

- ✓Invests Heavily in new Functionality … and Customers get it!
- ✓Provides Quality Systems and Customer Support
- ✓Provides Complete Software and Hardware Solutions
  - ✓Modular, Expandable Architectures that can grow with your needs
  - ✓Fault Tolerant PCs, Satellite & NOAAPort Ingest, Web Solutions
- ✓Markets Internationally … Future Product Growth on Track … Here For the Long Haul

IPSM Committed to Making LEADS Very Affordable Through Enterprise Pricing -- We Want Long Term Relationships

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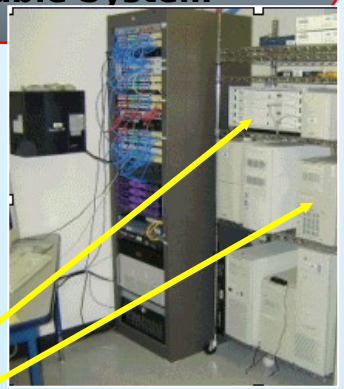
IPS NOAA Port Systems

All NWS Data -- As It Is Available

Observations & Forecasts
- GRIB (Worldwide Models)
- BUFR
- METAR
- Aviation Bulletins
- MET Bulletins
- NWS Graphics
- GOES-DCS DCP DATA
- Etc.

System-based Sensors
- NEXRAD
- Satellite
- Lightning

System Recently Upgraded
- Supports Increased NWS Data Rates
- Reliable, Affordable System



NOAAPORT INGEST

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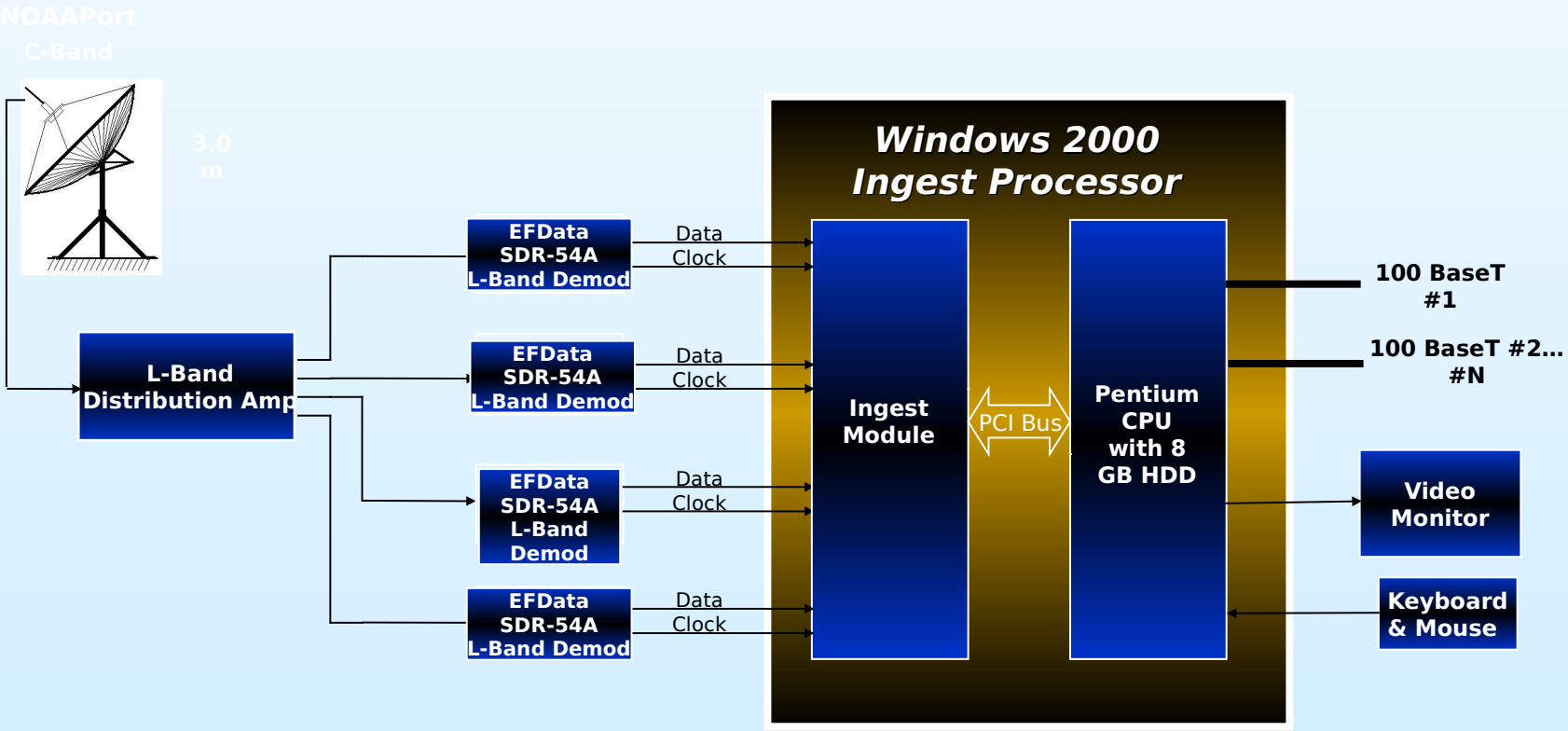
IPS NOAAPort System Architecture



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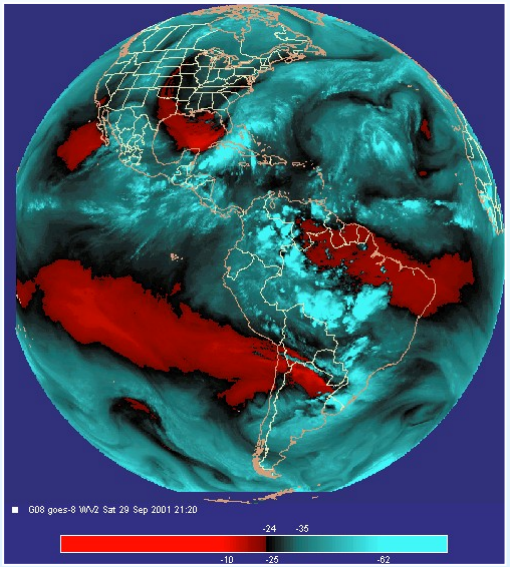
IPS MeteoStar

MAGELLAN

High Resolution Satellite Imagery Systems



- GOES GVAR
- GMS / MTSAT
- FY-2A
- METEOSAT
- TIROS

IPS *Magellan* Satellite Imagery Systems

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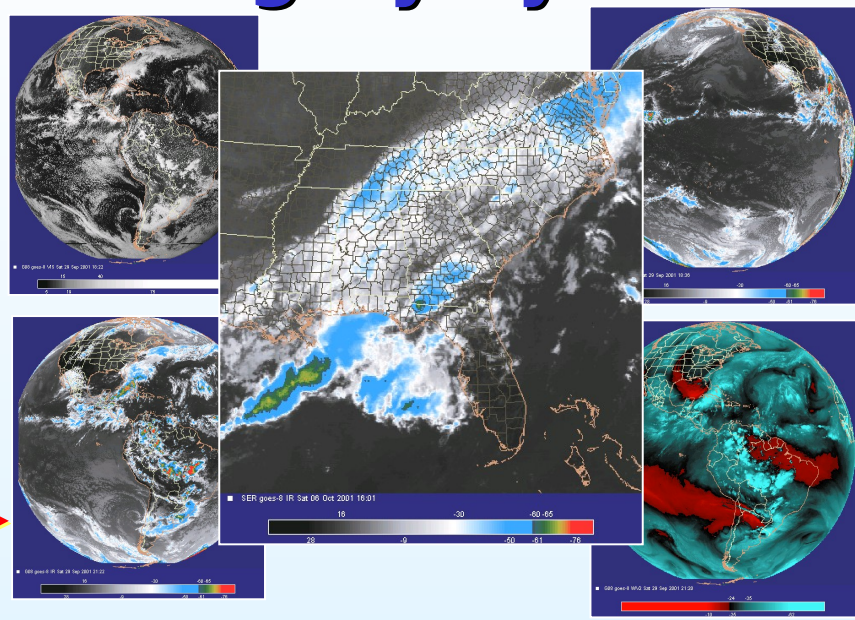
Satellite Imagery



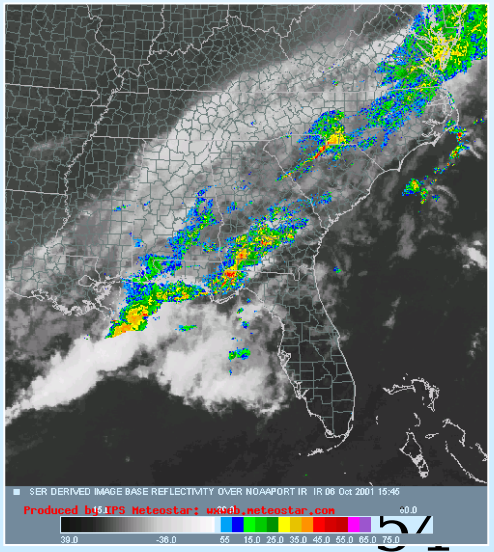
GOES

TIROS

Radar Data

LEADS

Composite Satellite and Radar Data



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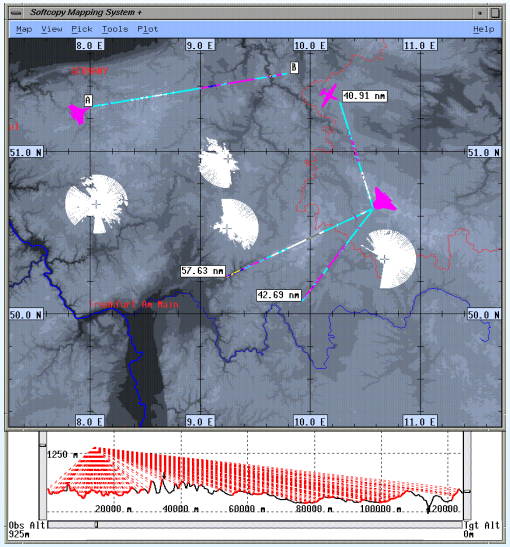
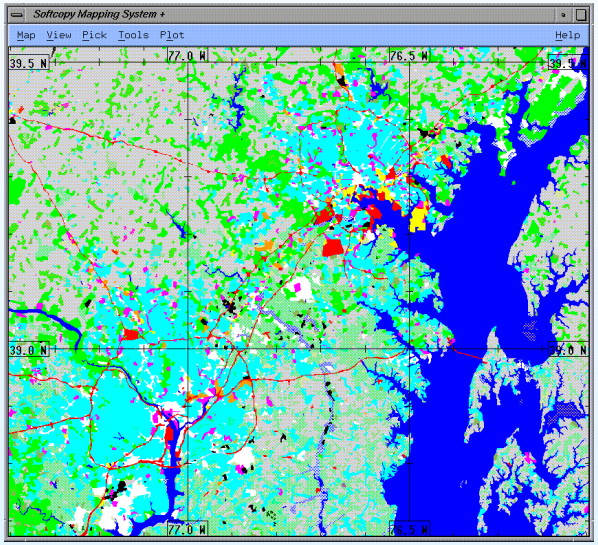
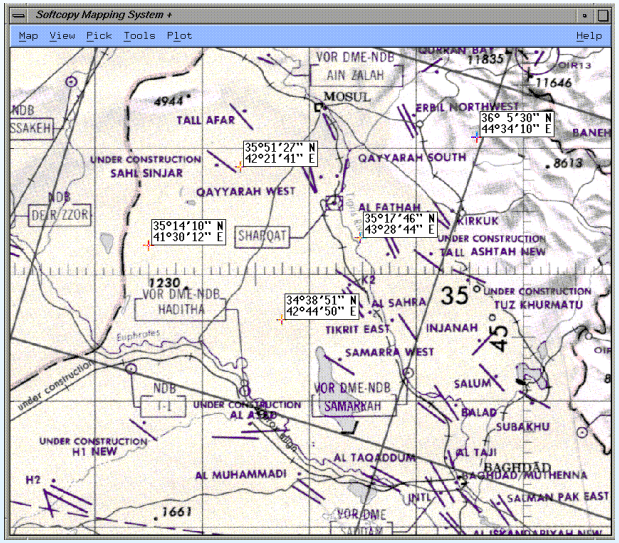
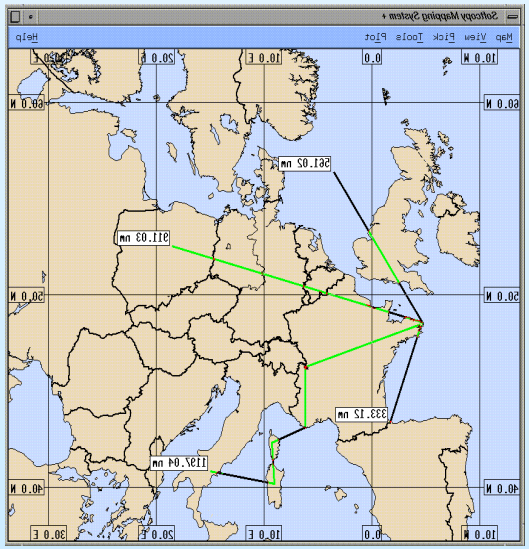
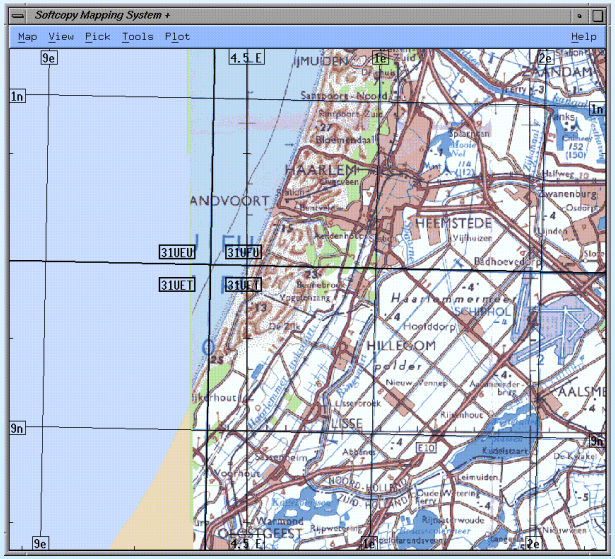
Enhanced Softcopy Mapping System (ESMS) Sample Products

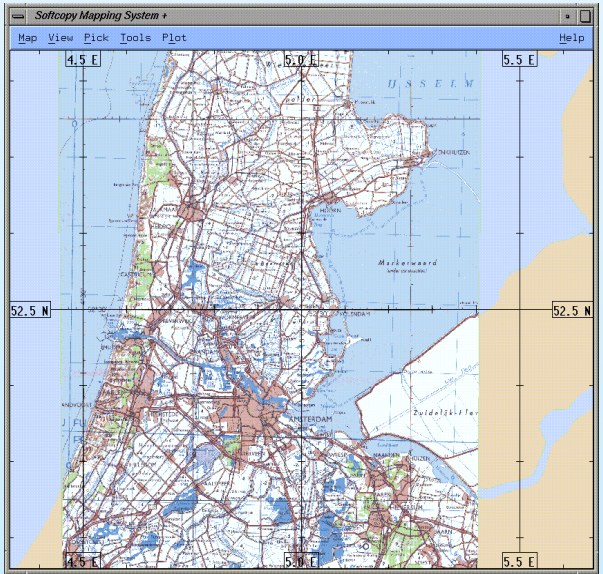












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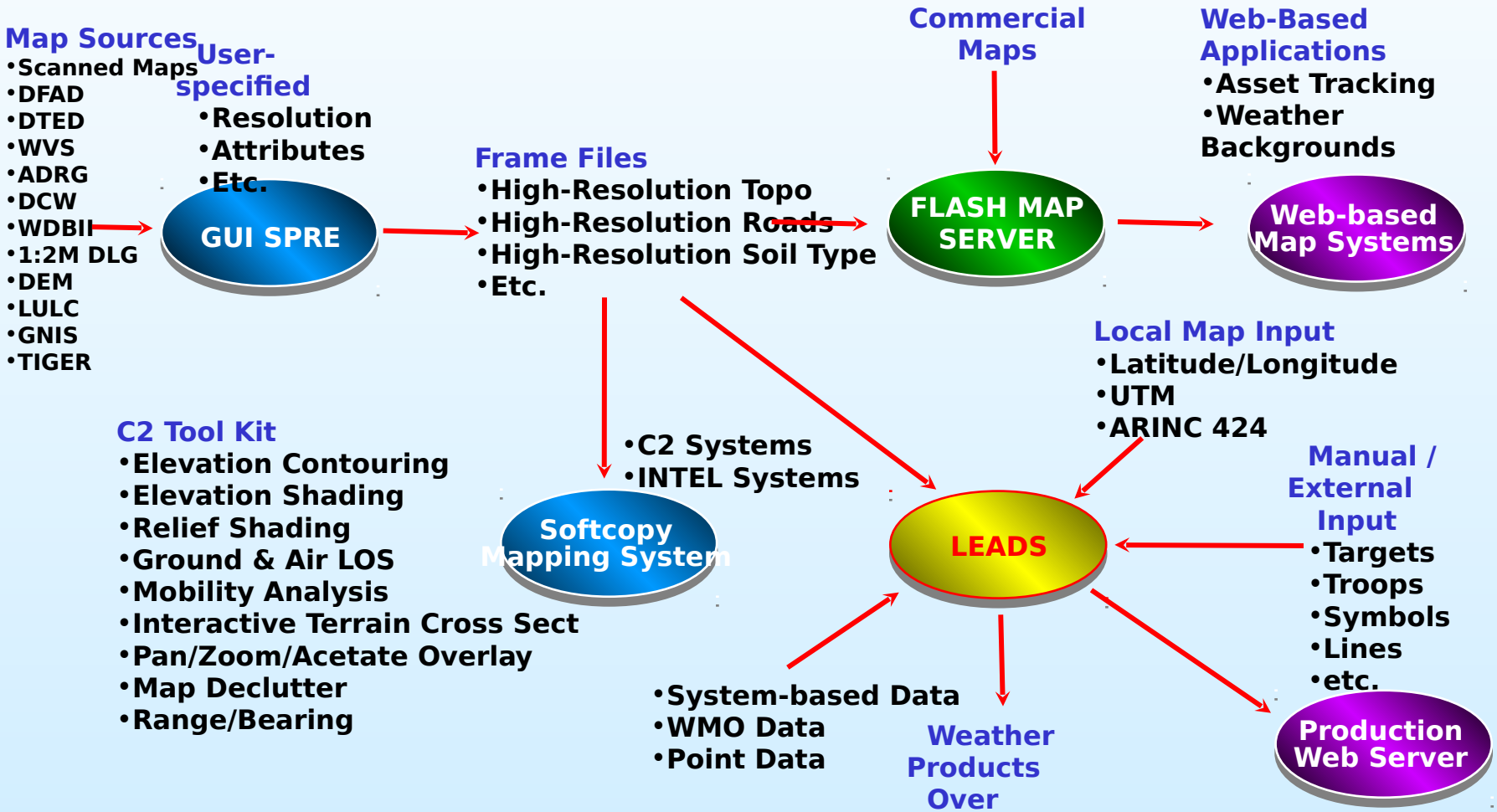
LEADS Integrated Map Backgrounds

(ESMS Bid as JMTK Solution...Still Used by Military)



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NIMA Map Integration into LEADS
Many Lat/Lon Overlay Resolutions

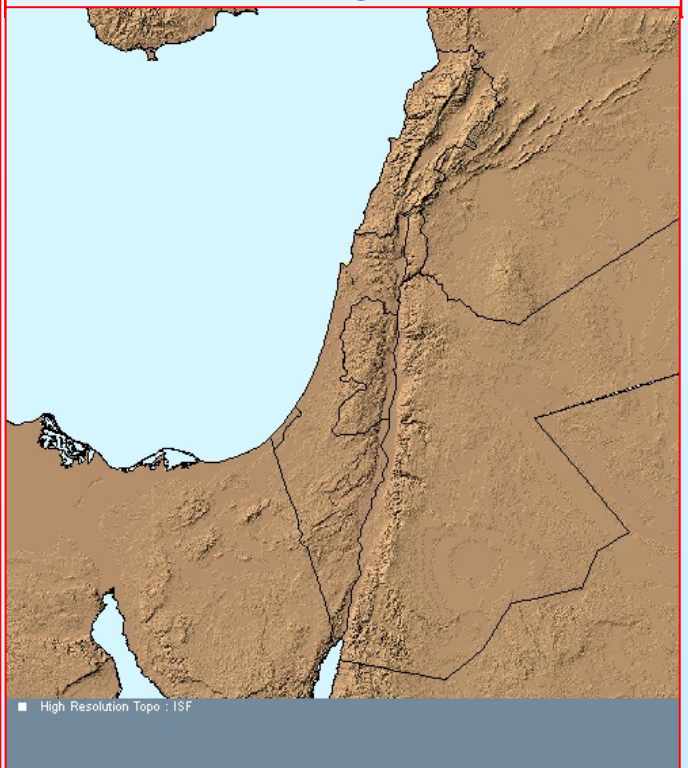
World Vector Shoreline (WVS): land, sea, shorelines and international boundaries. Also Process ESRI Map Data. Six resolutions (250,000:1 to 120,000,000:1). Maritime Boundaries only at 250,000:1. (Item in Red are Not Processed at

Under sea contours from WVS. Based on Digital Bathymetric DB: (3,000,000:1, 12,000,000:1 and 40,000,000:1)

High-resolution VMAPLVL0 Data.
One resolution only at this time.

a. inland water
b. land
c. coastlines
d. land types (lava, sand, cropland, grassland, oasis, orchards, swamps, trees, tundra)
e. landform lines (ice cliff, cliff, depressions, faults, rock formations)
f. fishing industry areas
g. extraction industry areas
h. water course lines (shows rivers as lines)
i. underwater hazards/reefs line feature
j. aqueduct / canals line features
k. international boundaries
l. state boundaries (worldwide)
m. snow / ice fields
n. ice shelf / polar ice
o. cities
p. military base area features
q. railroad lines
r. roads (these are not as good as the US roads we get from ESRI, but they are worldwide).
s. ferry crossings / causeways / bridges

1 km Topography Worldwide (Derived from DTED) AND FIVE DCW RESOLUTIONS GEOPOLITICAL, LAND/SEA, ETC.



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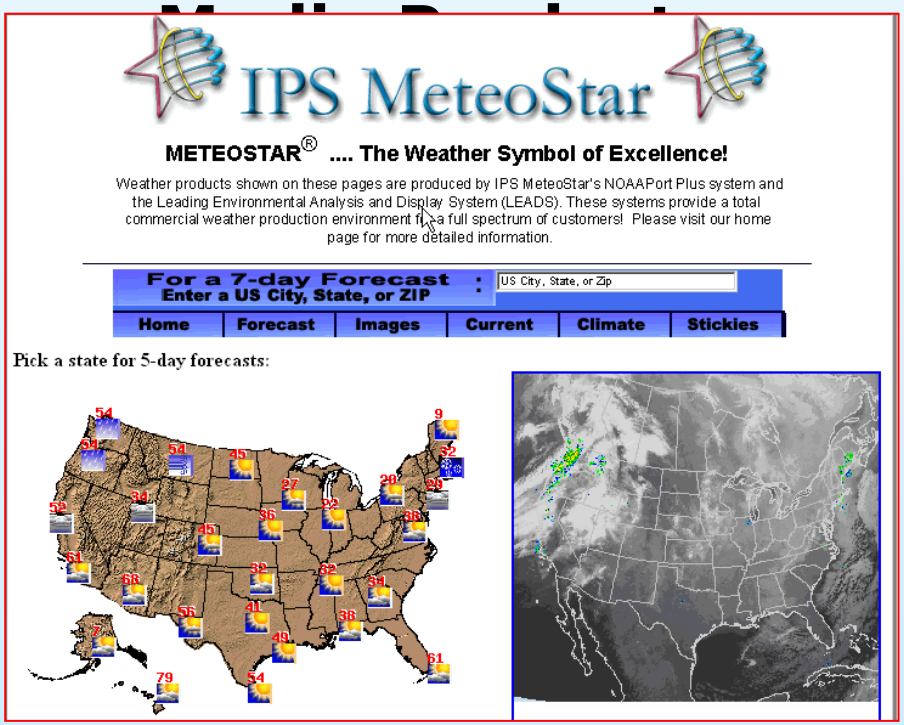
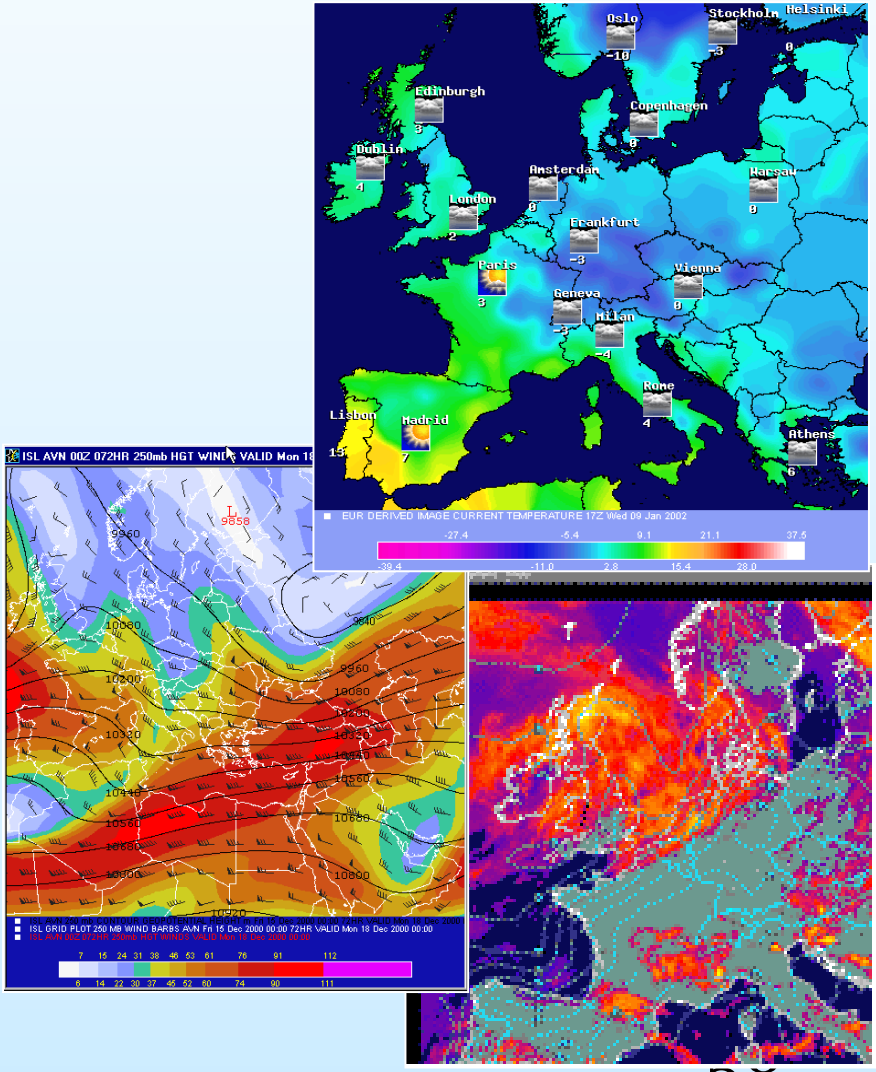
IPS MeteoStar Data *Distribution*

- **Local Area Networks**
- **Web Distribution**





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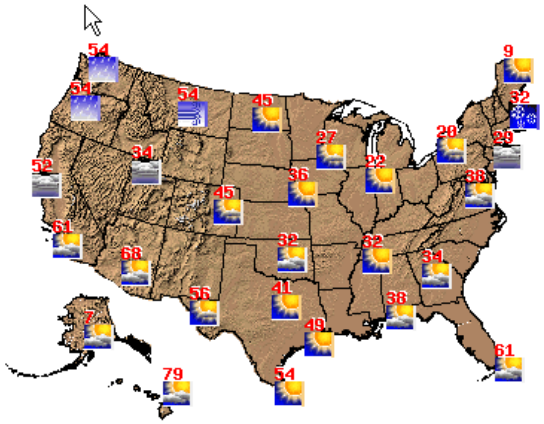
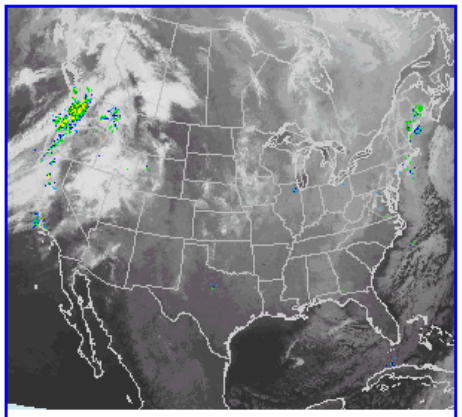
IPS MeteoStar WEBPAGE

For a 7-day Forecast : Enter a US City, State, or ZIP | US City, State, or Zip

Home | Forecast | Images | Current | Climate | Stickies

Pick a state for 5-day forecasts:





Products by IPS MeteoStar ®

Denver Weather Sticky Example

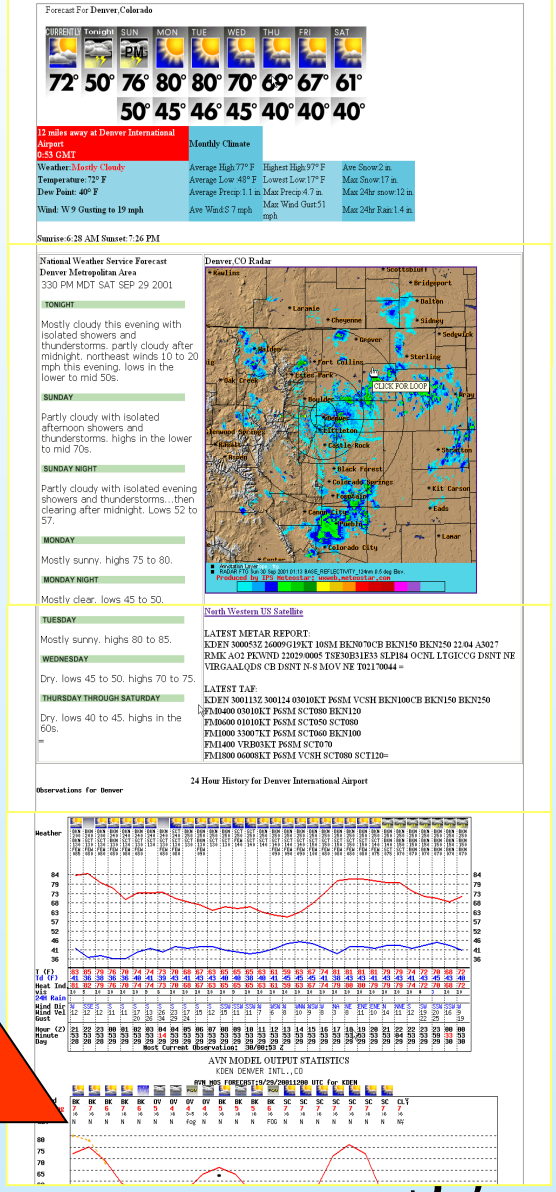
IPS Meteostar — Click for forecast

Denver, CO

T: 44 °F
Td:24 °F

CURRENT: Partly Cloudy
HUMIDITY: 41 %
BAROMETER: 1019 mb
WIND SPEED: SW 11 mph
VISIBILITY: 10 miles
Taken at: 0:53 GMT

...ents? Send me an e-mail. HERE



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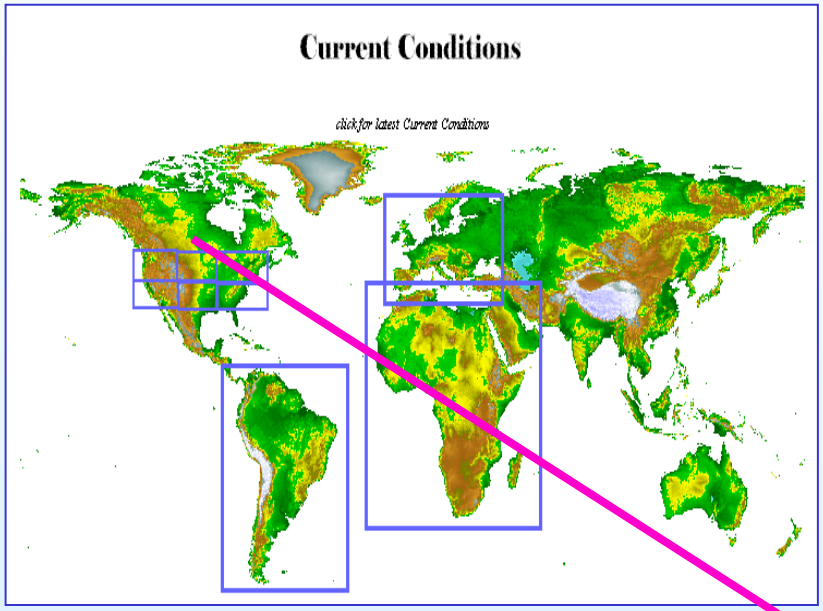
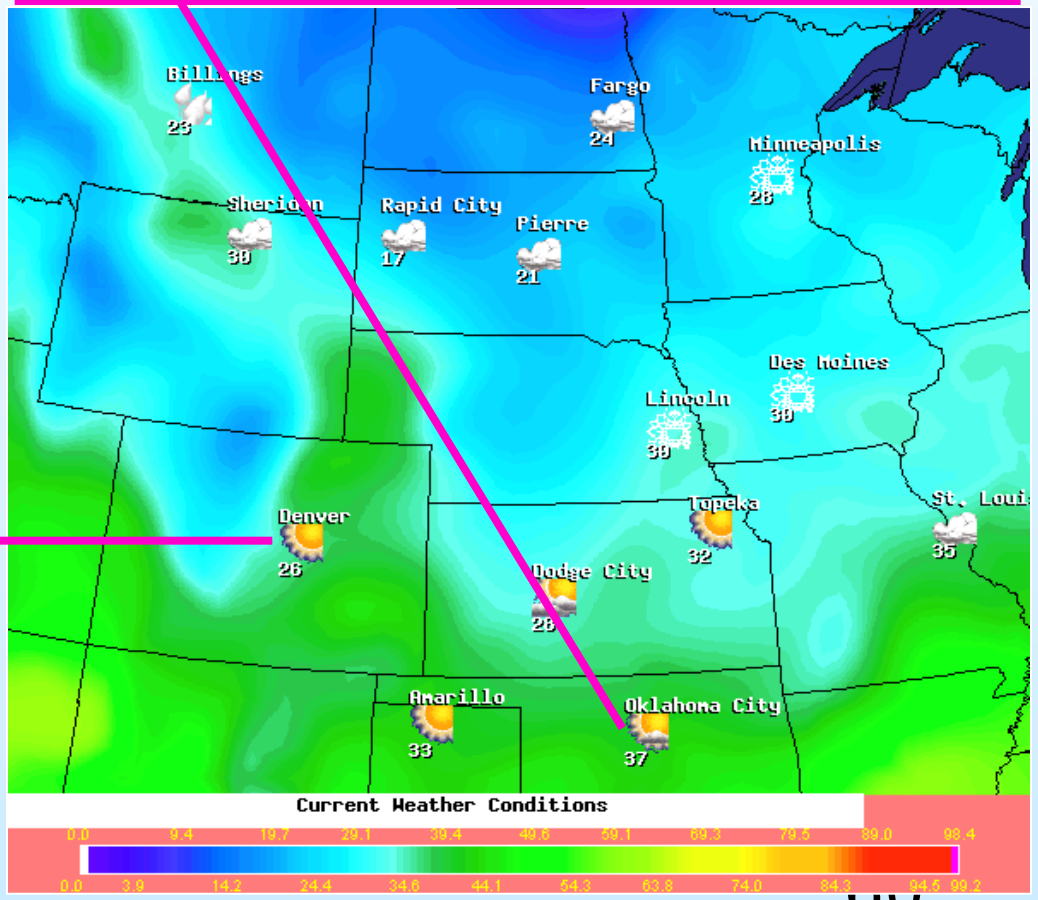
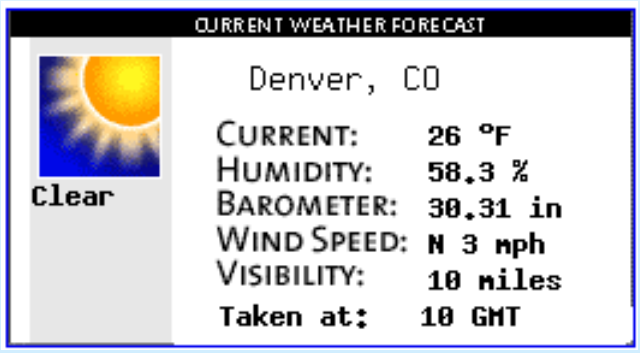
IPSM Web Server – Current Conditions







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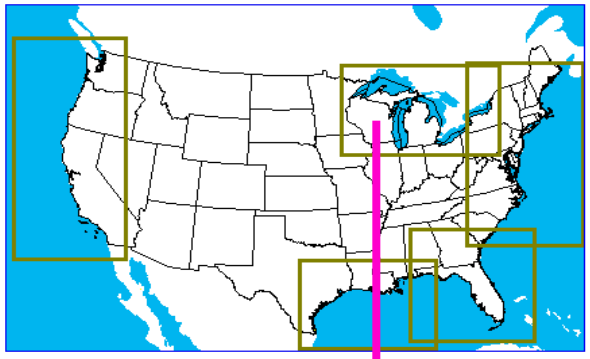
IPSM Web Server (http://wxweb.meteostar.com/)

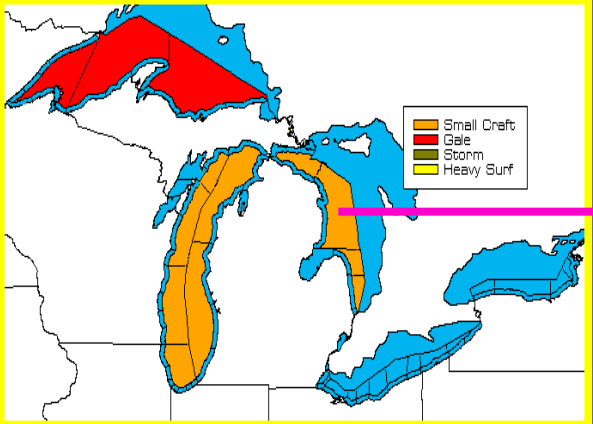
- Search Engine
- Warnings
- Marine
- tropical
- Surface Plots
- Climate Data
- Forecast Discussions
- Weather "Stickies"
- Weather Maps
- Satellite Images
- Radar Images
- Model Output
- Live Camera Views
- Moon Phase

Marine Forecast



Select a region for Marine Forecasts/Advisories.

GREAT LAKES MARINE PAGE



Select a region for Marine Forecasts/Advisories.

345 PM EST FRI DEC 1 2000

Synopsis through 48 hours...a weak surface trough...30.60 inches... will remain in place across southern lake huron tonight and saturday. Strong high pressure...30.70 inches...will build across northern lake huron tonight and saturday. A high pressure ridge will extend across lake huron saturday night and sunday. north half...

TONIGHT

Northeast wind 10 to 20 knots. A chance of snow showers. waves 2 to 5 feet.

SATURDAY

Northeast wind 10 to 20 knots...diminishing to 5 to 15 knots. A chance of snow showers. Waves 2 to 5 feet...subsiding 1 to 3 feet.

SATURDAY NIGHT

Northeast wind 5 to 15 knots...becoming variable. waves 1 to 3 feet.

SUNDAY

Southwest wind 5 to 15 knots...increasing to 10 to 20 knots. A chance of snow showers. Waves 2 to 4 feet.

IPSM Web Server – Models & Live Wx

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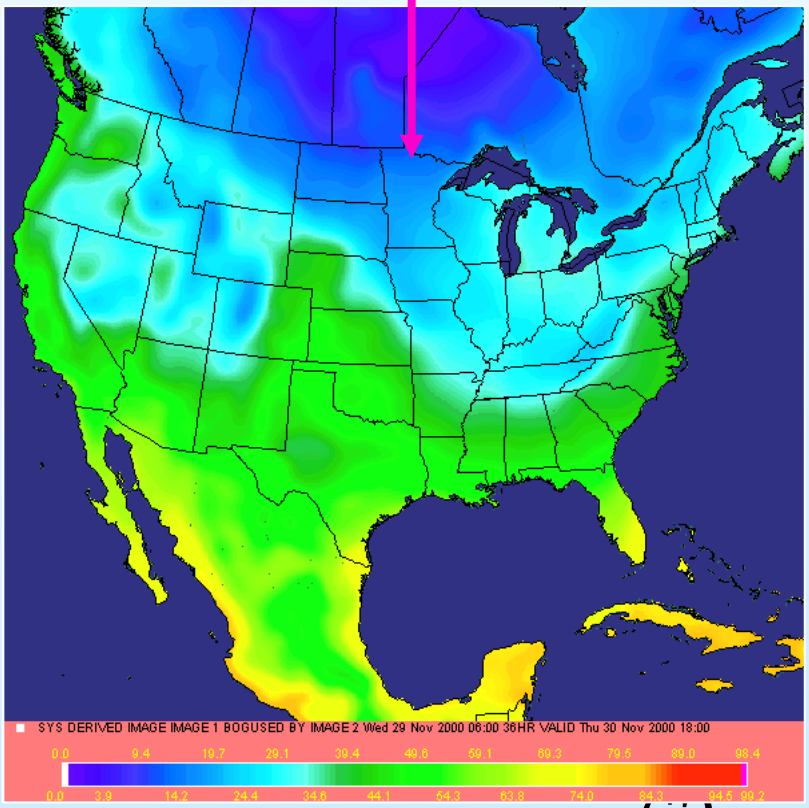
- Search Engine
- Warnings
- Marine
- tropical
- Surface Plots
- Climate Data
- Forecast Discussions
- Weather "Stickies"
- Weather Maps
- Satellite Images
- Radar Images
- Model Output
- Live Camera Views
- Moon Phase

MM5 accumulated rainfall	Analysis	03	06	09	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	Loop
MM5 accumulated snowfall	Analysis	03	06	09	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	Loop
MM5 mslp/10-m wind/precip	Analysis	03	06	09	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	Loop
MM5 700 mb ht/wind/vv	Analysis	03	06	09	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	Loop
MM5 2-meter Temperature	Analysis	03	06	09	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	Loop
MM5 2-meter Dew Point Temp	Analysis	03	06	09	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	Loop

- Atlanta, GA
- Baltimore, MD
- Charlotte, NC
- Chicago,IL
- Dallas, TX
- Denver, CO
- Detroit, MI
- Houston, TX
- Kansas City, KS
- Las Vegas, NV
- Los Angeles, CA
- Miami, FL
- Nashville, TN
- New York City, NY
- Orlando, FL
- Pittsburgh, PA
- Portland, OR
- Sacramento, CA
- San Diego, CA
- San Francisco, CA
- Seattle, WA
- Tampa, FL



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IPS MeteoStar Products

Leading Environmental Analysis and Display System

(LEADS)

Environmental Monitoring Systems (EMS)

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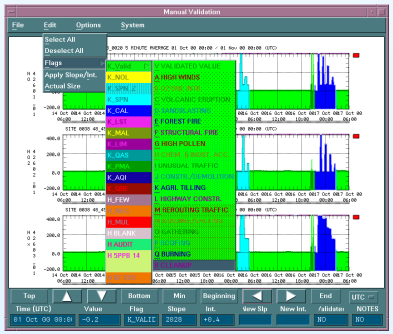
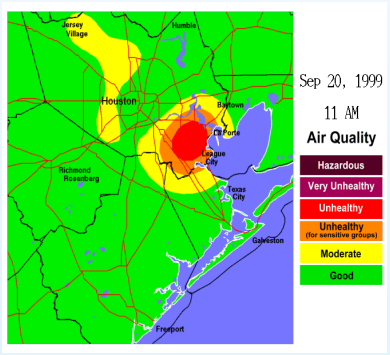
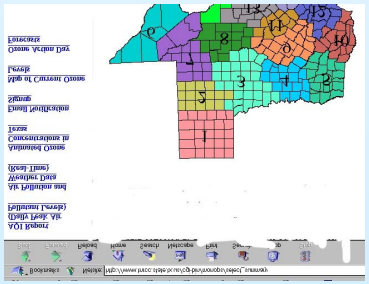
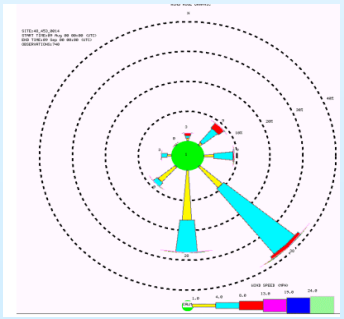
IPS Environmental Monitoring Systems

LEADS EMS





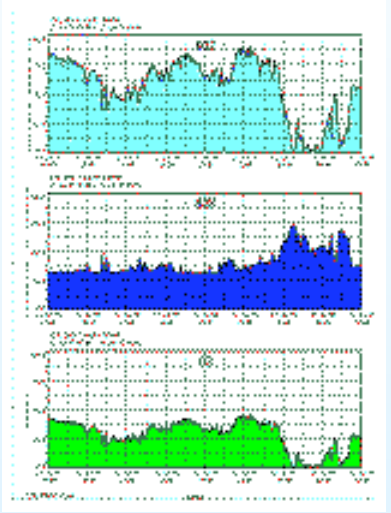


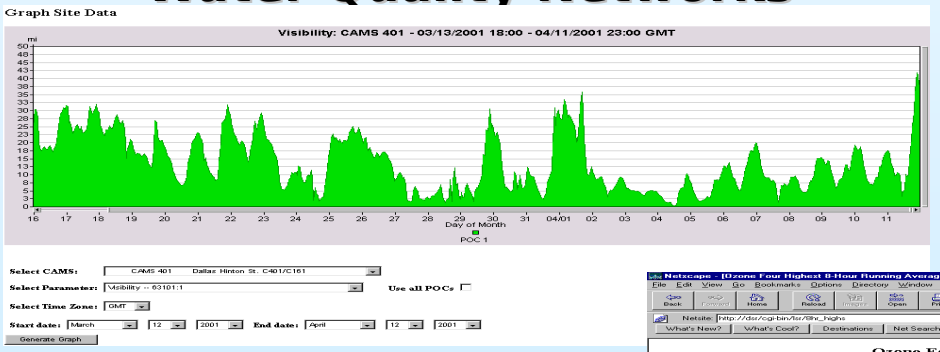


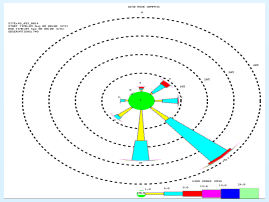
MeteoStar® ... The Weather Symbol Of Excellence

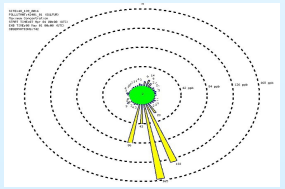
IPS LEADS Environmental Monitoring Systems (LEADS EMS)

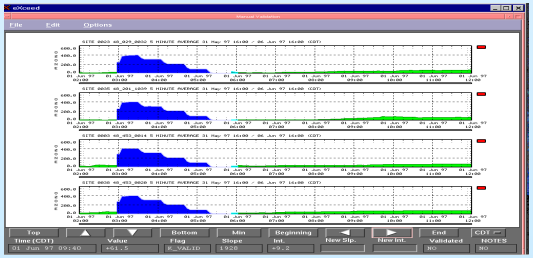
- Automated Meteorological Networks
- Automated Hydrological Networks
- Air Quality Networks
- Water Quality Networks

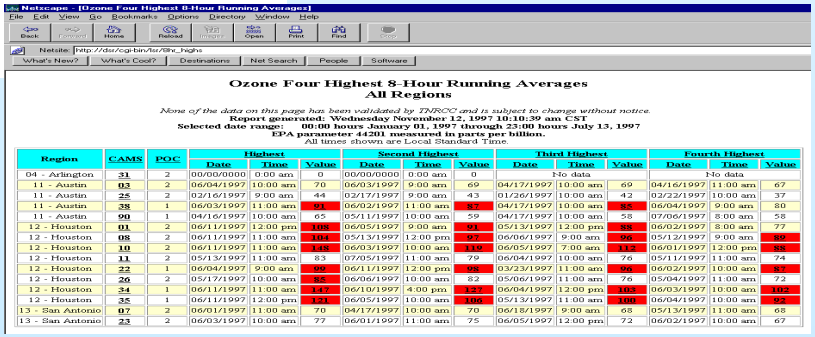












Ozone Four Highest 8-Hour Running Averages
All Regions

Region	CAMS	POC	Highest			Second Highest			Third Highest			Fourth Highest		
			Date	Time	Value	Date	Time	Value	Date	Time	Value	Date	Time	Value
04 - Arlington	31	2	00/00/0000	0:00 am	0	00/00/0000	0:00 am	0	No data			No data		
11 - Austin	03	2	06/04/1997	10:00 am	70	06/03/1997	9:00 am	69	04/17/1997	10:00 am	69	04/16/1997	11:00 am	67
11 - Austin	25	2	02/16/1997	9:00 am	44	02/17/1997	9:00 am	43	01/26/1997	10:00 am	42	02/22/1997	10:00 am	37
11 - Austin	38	1	06/03/1997	11:00 am	91	06/02/1997	11:00 am	87	04/17/1997	10:00 am	85	06/04/1997	9:00 am	80
11 - Austin	90	1	04/16/1997	10:00 am	65	05/11/1997	10:00 am	59	04/17/1997	10:00 am	58	07/06/1997	8:00 am	58
12 - Houston	01	2	06/11/1997	12:00 pm	108	06/05/1997	9:00 am	91	05/13/1997	12:00 pm	88	06/02/1997	8:00 am	77
12 - Houston	08	2	06/11/1997	11:00 am	104	05/13/1997	12:00 pm	97	06/06/1997	9:00 am	96	05/12/1997	9:00 am	89
12 - Houston	10	2	06/11/1997	11:00 am	148	06/03/1997	10:00 am	119	06/05/1997	7:00 am	117	06/01/1997	12:00 pm	95
12 - Houston	11	2	05/13/1997	11:00 am	83	07/05/1997	11:00 am	79	06/04/1997	10:00 am	76	05/11/1997	11:00 am	74
12 - Houston	22	1	06/04/1997	9:00 am	99	06/11/1997	12:00 pm	98	03/23/1997	11:00 am	96	06/02/1997	10:00 am	87
12 - Houston	26	2	05/17/1997	10:00 am	86	06/06/1997	10:00 am	82	05/06/1997	11:00 am	76	05/04/1997	11:00 am	72
12 - Houston	34	1	06/11/1997	11:00 am	147	06/10/1997	4:00 pm	127	06/04/1997	12:00 pm	103	06/03/1997	10:00 am	103
12 - Houston	35	1	06/11/1997	12:00 pm	121	06/05/1997	10:00 am	106	05/13/1997	11:00 am	100	06/04/1997	10:00 am	92
13 - San Antonio	07	2	06/01/1997	11:00 am	70	04/17/1997	10:00 am	70	06/18/1997	9:00 am	68	05/13/1997	11:00 am	68
13 - San Antonio	23	2	06/03/1997	10:00 am	77	06/01/1997	11:00 am	75	06/05/1997	12:00 pm	72	06/02/1997	10:00 am	67

MeteoStar® ... The Weather Symbol Of Excellence

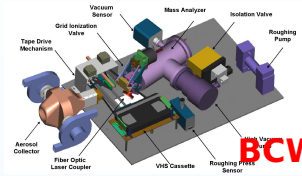
LEADS EMS Recognized by EPA

EPA Clean Air Excellence Award

Presented by the EPA Administrator Christine Todd Whitman For The

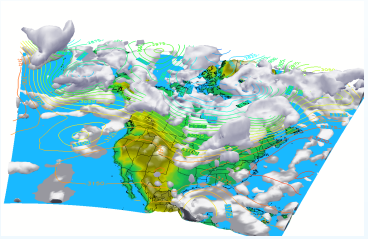
TNRCC (now TCEQ) MeteoStar System

LEADS EMS Technologies



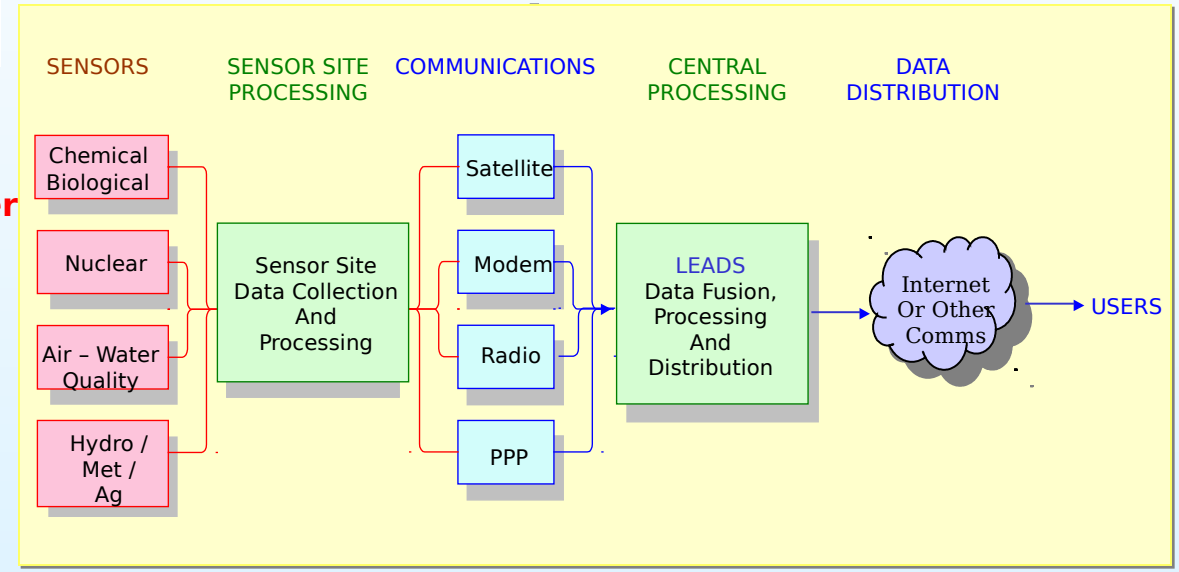
BCWA & Environmental Sensors

Meteorological Forecast



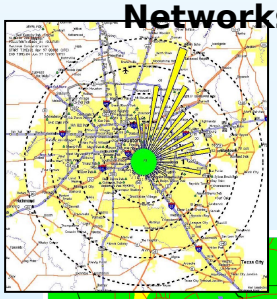
Profilers

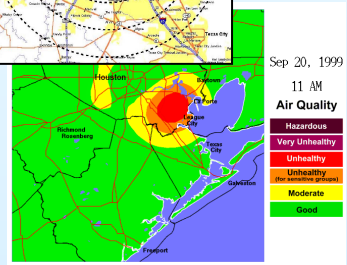
IPS LEADS



Weather Radar

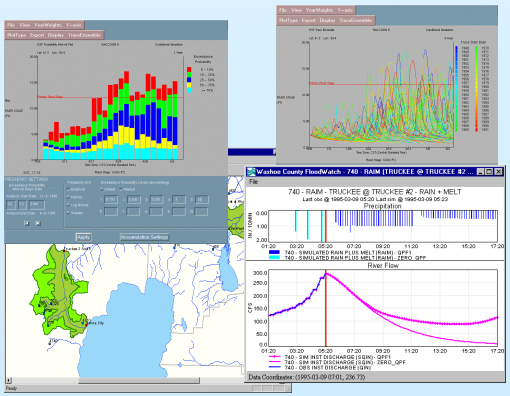
BCWA and Air Quality Networks



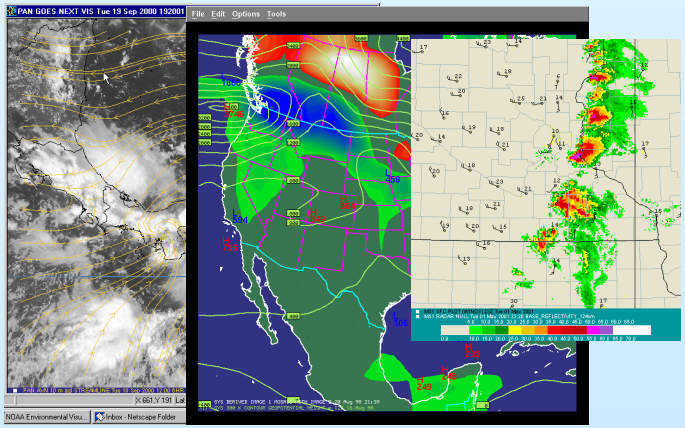


Surface Networks

Flood Forecasting



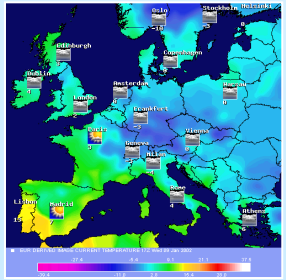
Meteorological Product Generation



Lightning Data

Satellite Imagery

TV & Media



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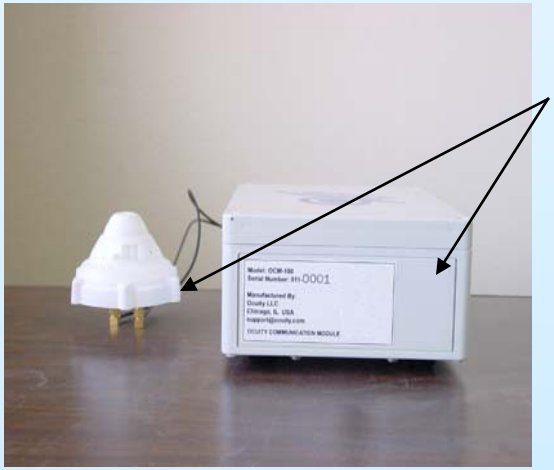
IPS Environmental Monitoring Systems

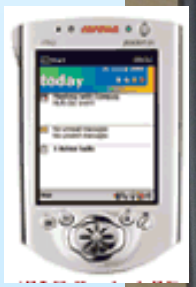
LEADS EMS

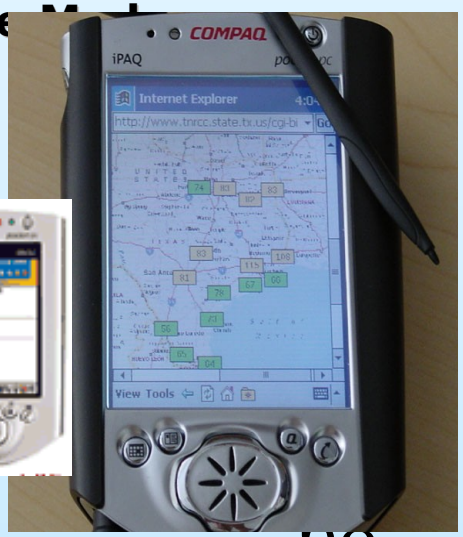
- 18” X 32” Very Small Aperture Satellite Terminal (VSAT) “Always On” Satellite Communications



- 12 Volt Low Earth Orbit (LEO) Satellite M

- Wireless Web





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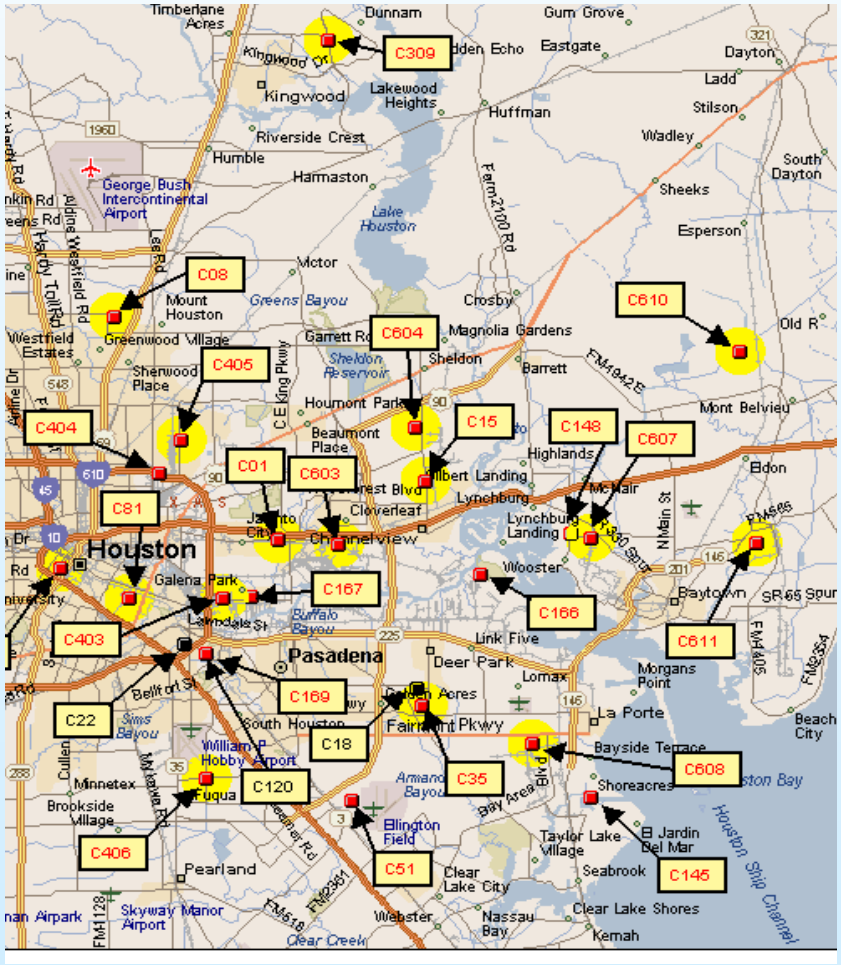
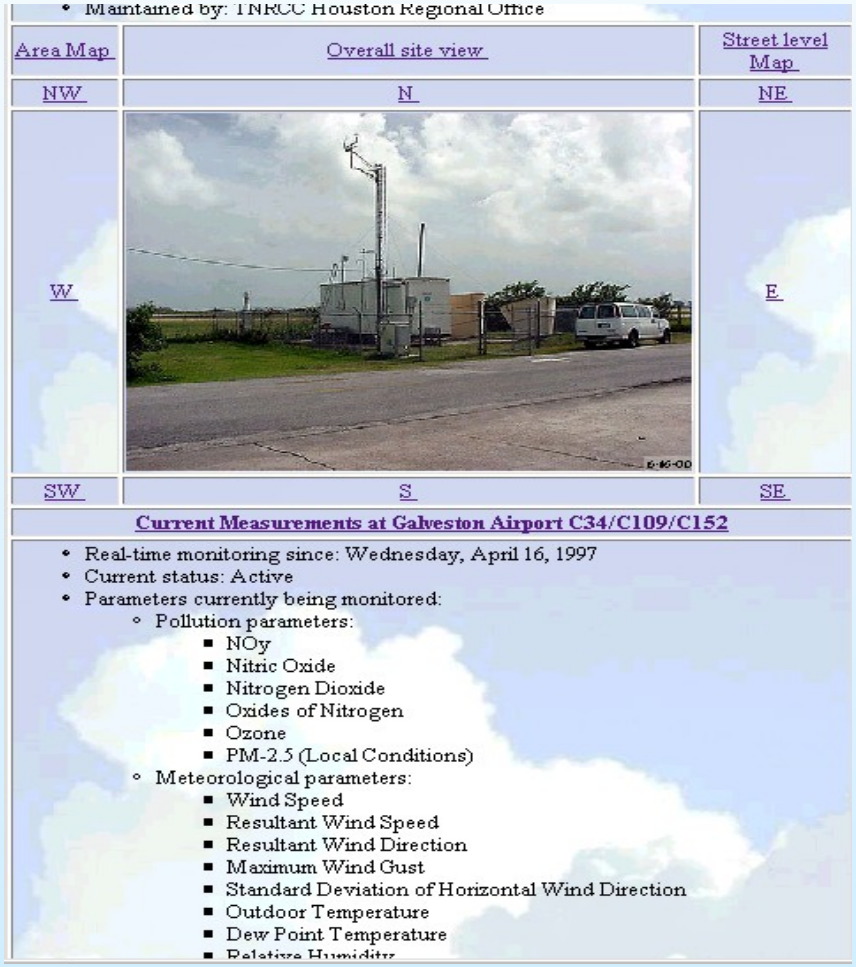
IPS Environmental Monitoring Systems *LEADS EMS*





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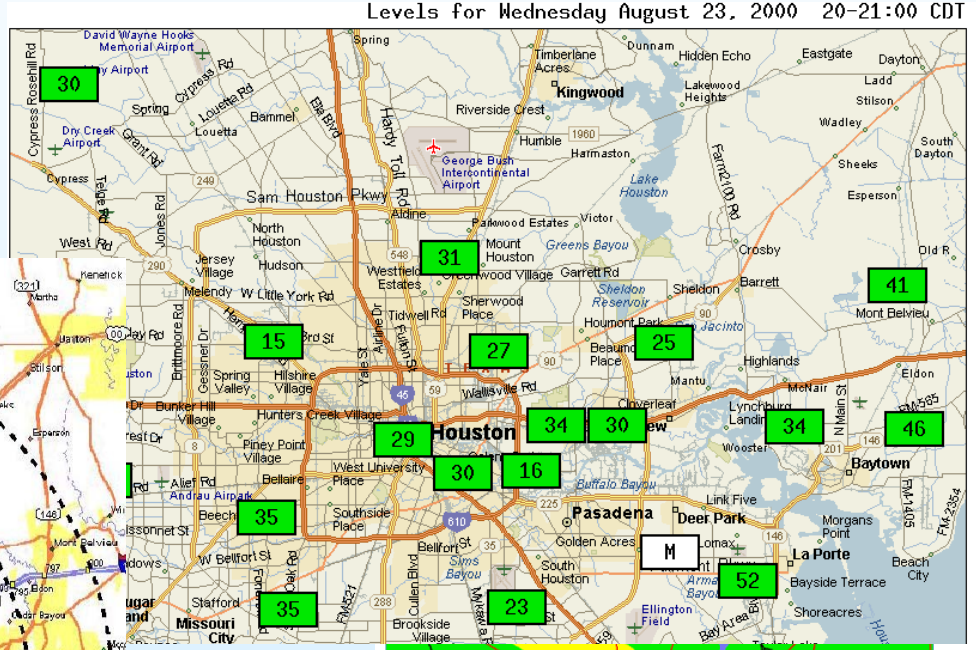
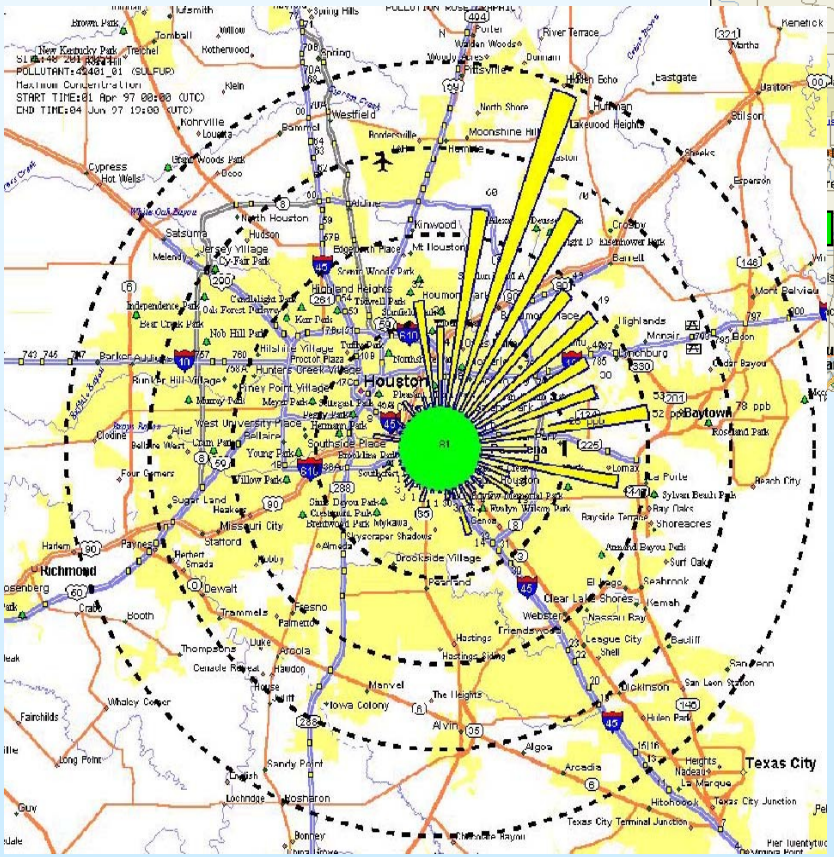
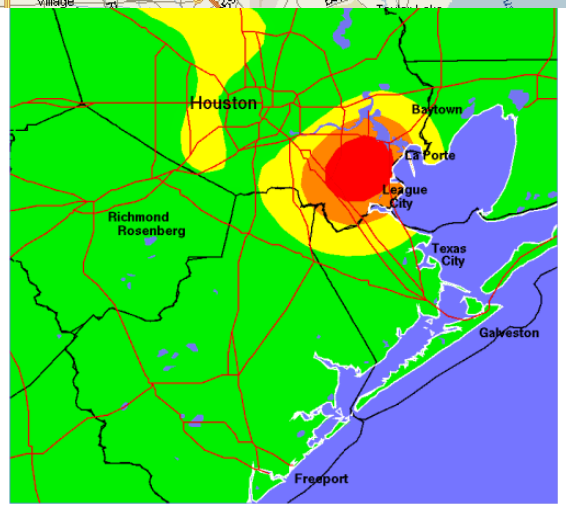
IPS Environmental Monitoring Systems *LEADS EMS*







Sep 20, 1999

11 AM

Air Quality

- Hazardous
- Very Unhealthy
- Unhealthy
- Unhealthy (for sensitive groups)
- Moderate
- Good

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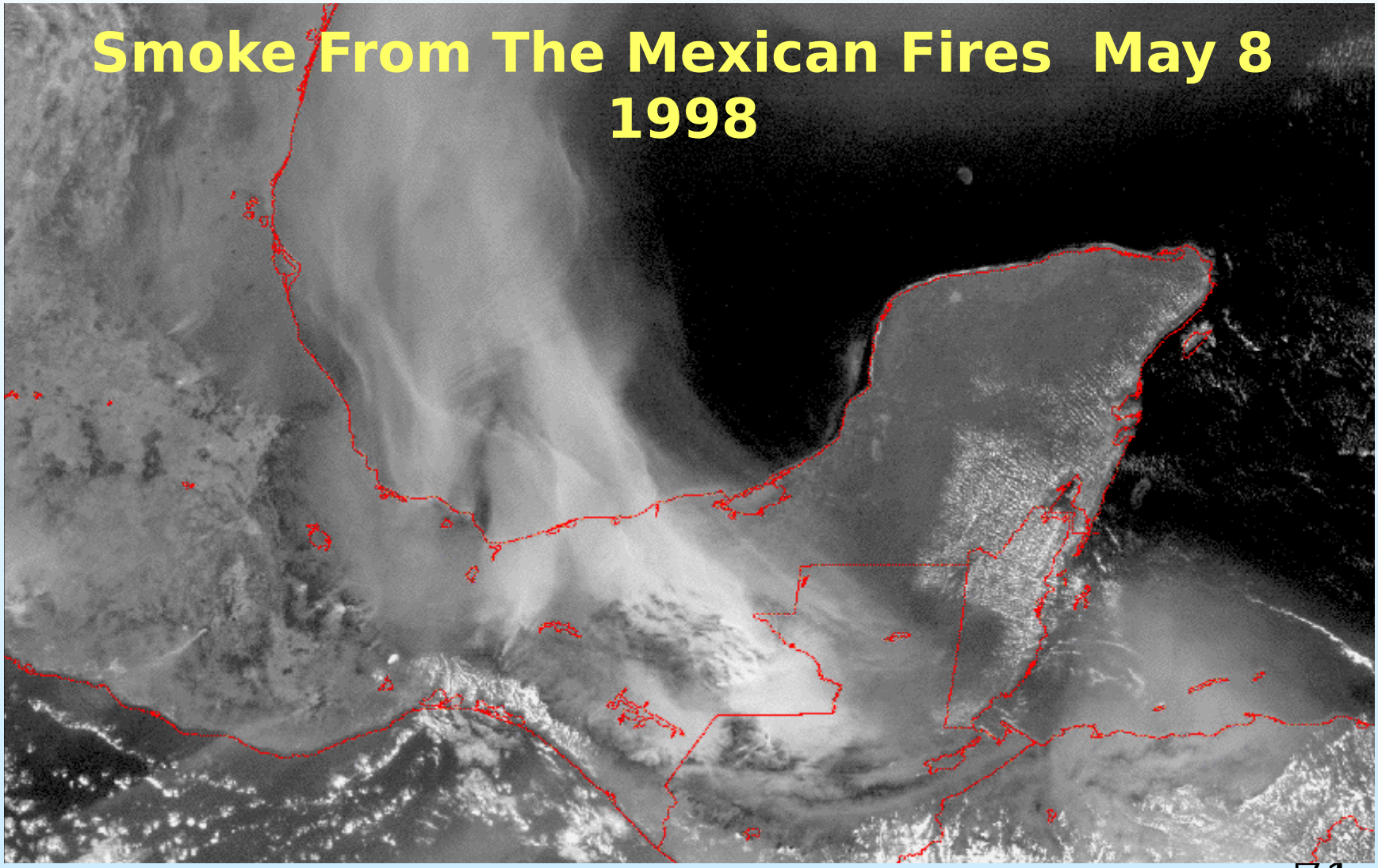
IPS Environmental Monitoring Systems *LEADS EMS* Example



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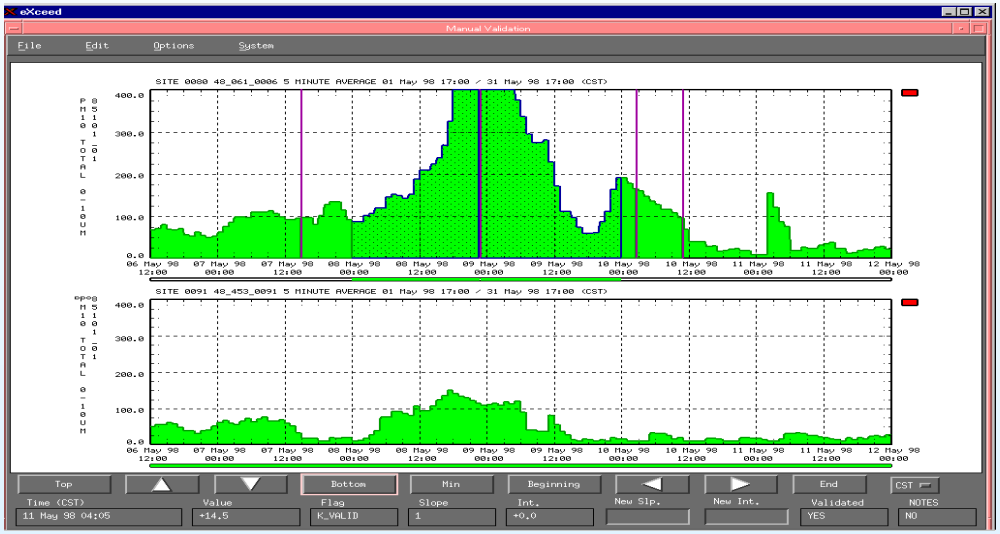
IPS Environmental Monitoring Systems

LEADS EMS Example



- **Brownsville station recorded An Hourly Maximum Of 549**
- **Austin recorded A Maximum Of 147**

Beta Gauge PM-10 (Local Conditions) Hourly Averages

None of the data on this page has been validated by TNRCC and is subject to change without notice.
Report generated: Friday September 18, 1998 11:11:02 CST
Friday May 8, 1998 **EPA parameter 85101 measured in micrograms per cubic meter.**
All times shown are Local Standard Time.

Region	CAMS	Morning												Afternoon											CAMS	POC
		Mid	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	Noon	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00		
Austin	91	9.41	10.60	16.45	26.14	37.20	74.39	74.70	90.68	90.80	84.91	79.67	105.64	92.78	92.67	105.74	121.53	133.02	147.84	140.20	132.16	127.18	120.74	112.69	107.79	91	1
Lower Rio Grande Valley	80	85.28	85.12	99.77	104.71	118.26	118.63	144.02	151.21	147.62	140.99	151.10	185.42	206.82	207.41	222.78	237.30	266.91	322.64	456.68	548.03	549.83	519.94	541.94	542.89	80	1

Columns with **highlighted headers** will be included in the next day's completeness calculation.
Maximum values for Beta Gauge PM-10 (Local Conditions) for the day are highlighted within the table.

None of the data on this page has been validated by TNRCC and is subject to change without notice.

Previous Day BetaGage PM10 (Lcl) Summary

Thursday May 7, 1998
EPA parameter 85101 measured in micrograms per cubic meter.
All times shown are Local Standard Time.

Region	CAMS	POC	Daily Maximum		Completeness *
			Daily Maximum	Hour of Occurrence	
Austin	91	1	74.65	8:00 am	24 (100%)
Harlingen	80	1	132.87	9:00 pm	24 (100%)

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IPS Environmental Monitoring Systems

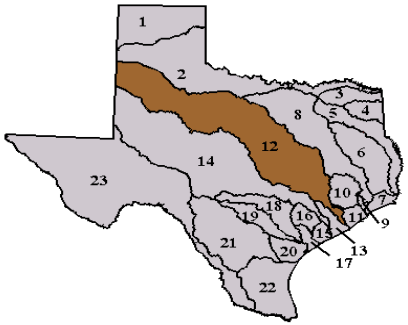
New Water Monitoring Capability

Daily Summary Report By Site

The TNRCC now offers water monitoring data from stations located in selected river basins of the state.

Select a highlighted river basin from the map below to retrieve a daily summary of hourly data collected at TNRCC's water monitoring stations. These mon
stations sample the water stream once every fifteen minutes. Hourly averages are then calculated from these fifteen-minute averages.

Although this is the most current data, it is not considered official until it has been certified by the TNRCC technical staff. Only data from TNRCC monitori
monitoring entities that are partnered with the TNRCC is available via this web page. This information is updated hourly.



1 - Canadian River Basin
2 - Red River Basin
3 - Sulphur River Basin
4 - Cypress River Basin
5 - Sabine River Basin
6 - Neches River Basin
7 - Neches-Trinity Coastal Basin
8 - Trinity River Basin
9 - Trinity-San Jacinto Coastal Basin
10 - San Jacinto River Basin
11 - San Jacinto-Brazos Coastal Basin
12 - Brazos River Basin
13 - Brazos-Colorado Coastal Basin
14 - Colorado River Basin
15 - Colorado-Lavaca Coastal Basin
16 - Lavaca River Basin
17 - Lavaca-Guadalupe Coastal Basin
18 - Guadalupe River Basin
19 - San Antonio River Basin
20 - San Antonio-Nueces Coastal Basin
21 - Neuces River Basin
22 - Nueces-Rio Grande Coastal Basin
23 - Rio Grande River Basin

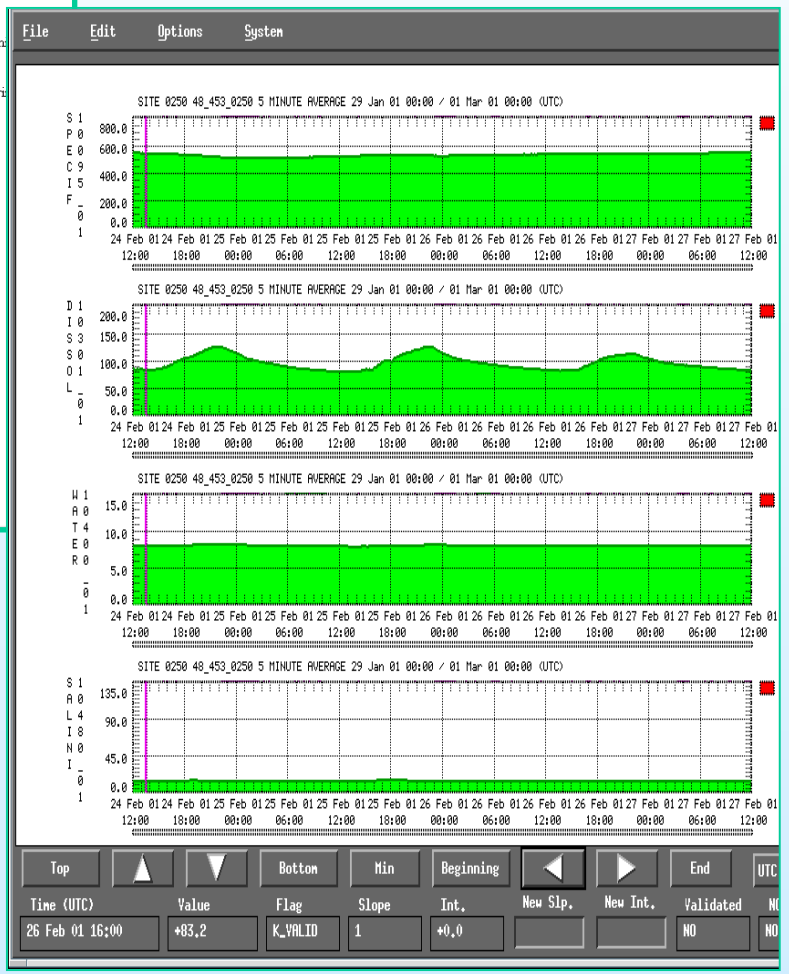
Clifton Water Site C702

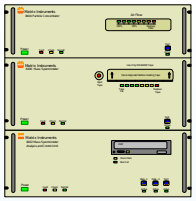
- Address: Clifton
- City: Clifton
- County: Bosque
- Site coordinates:
  - Latitude: 31° 47' 45" North
  - Longitude: 97° 34' 45" West
- Maintained by: TNRCC Waco Regional Office

Area Map	Overall site view	Street level Map
	Upstream	
Left Bank		Right Bank
	Downstream	

Current Measurements at Clifton Water Site C702

- Real-time monitoring since: Wednesday, August 15, 2001
- Current status: Active
- Parameters currently being monitored:
  - Water parameters:
    - Water Temperature
    - Specific Conductance
    - Chlorophyll-a
    - Turbidity
    - Dissolved Oxygen

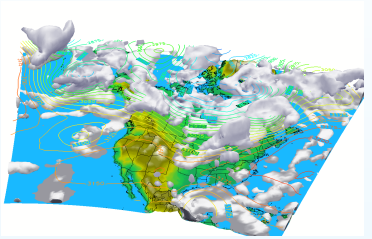




MI2

Team Approach Leveraging Technologies

Meteorological Forecast



BCWA & Environmental Sensors

Profilers

Weather Radar

Surface Networks

SENSORS

SENSOR SITE PROCESSING

CENTRAL PROCESSING

Chemical Biological

Nuclear

Air – Water Quality

Hydro / Met / Ag

Sensor Site Data Collection And Processing

IPS LEADS

COMMUNICATIONS

Engine

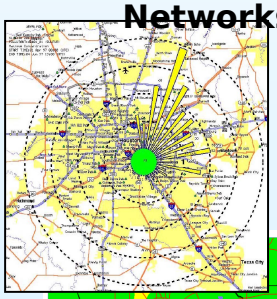
LEADS Data Fusion, Processing And Distribution

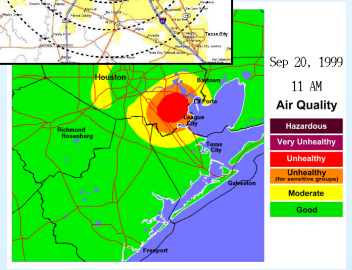
DATA DISTRIBUTION

DynCorp HIRTS+

USERS

BCWA and Air Quality Networks





Narrowband Users

HIRTS +

Wideband User

ArrayComm i-Burst

Cell Or Satellite

Command &

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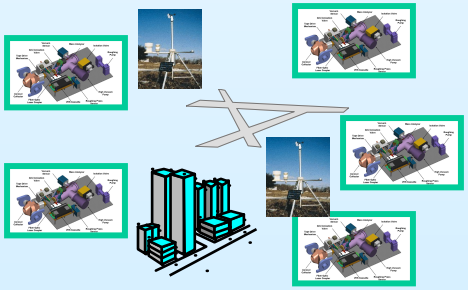
LEADS Tactical & Fixed Base Automatic Data Collection, Display & Distribution

COMMUNICATIONS
Iridium, Low Earth Orbiting Satellite, VSAT, Tactical Wireless Web, Phone (DSL, ISDN), and others

Data Amount ~ 150 bytes / Sensor Suite / Report

COMMERCIAL SATCOM

Remote Tactical Sensor Suites



LEADS Front End Processor

LEADS Server(s)

GCCS
SIPRNET/NIPRNET
Or Other Comms

Other Government Agencies

Homeland Security

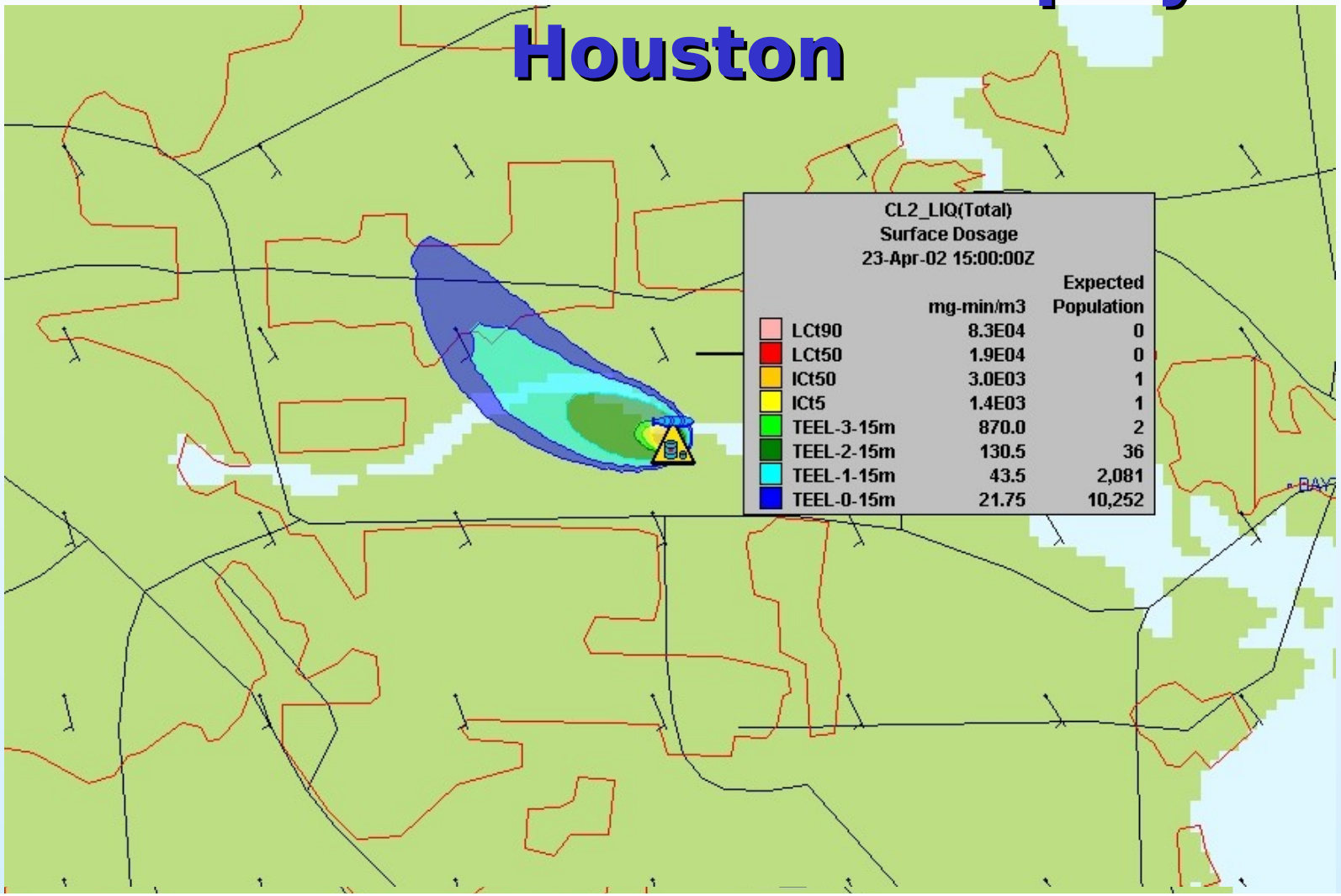
Others

Joint Staff Services/NCA

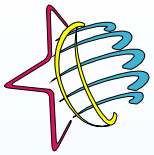
CINC

JTF Commander

HPAC Diffusion Model Display for Houston



Surface Dosage - Chlorine Vessel Explosive Rupture
Note - Toxic region stabilizes rapidly
Note -Influence of the met on contours - barbs are wind barbs



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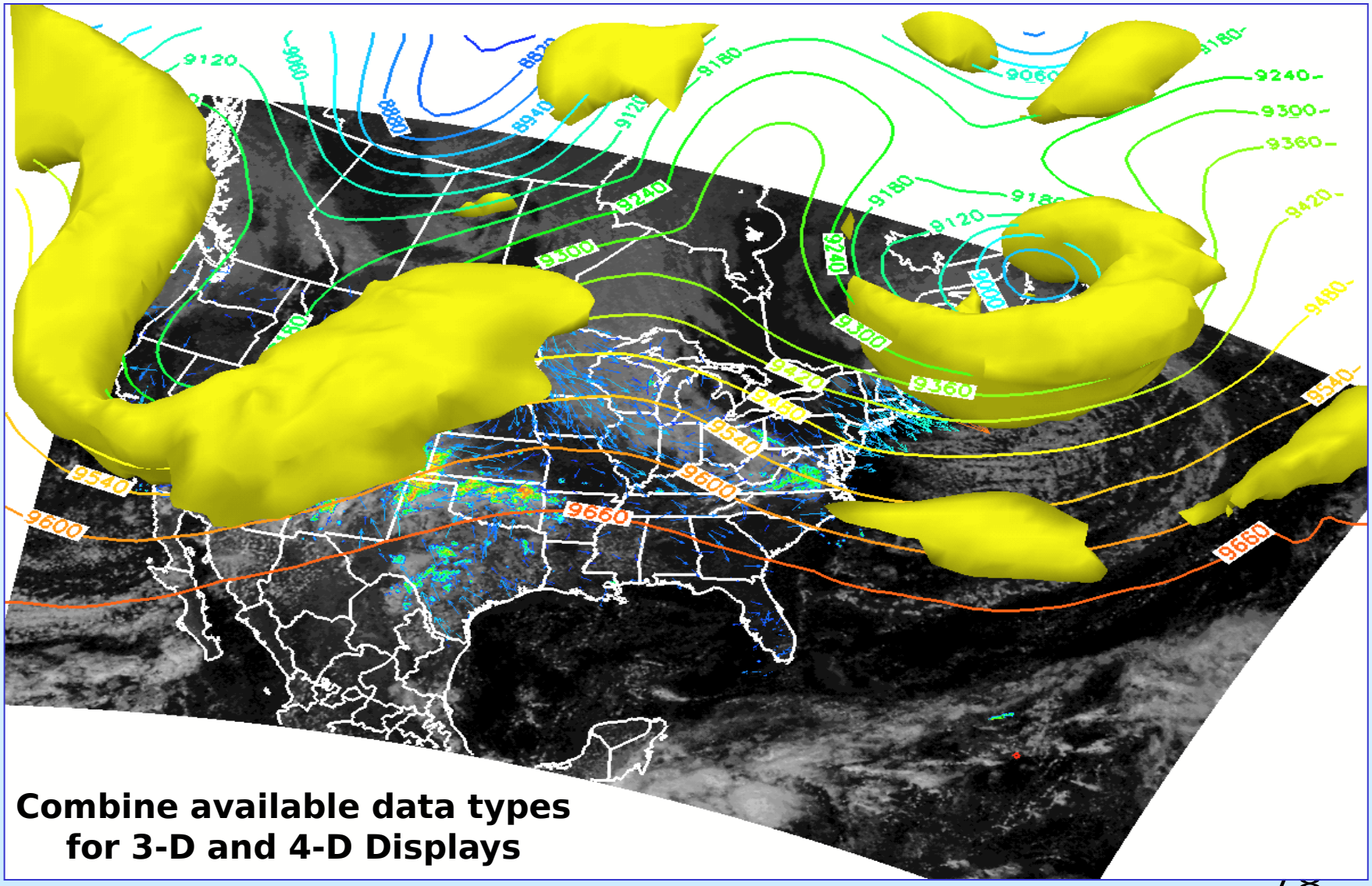
IPS / SSESCO *Systems*

- **SSESCO 3-D / 4 – D Environmental WorkBench (EWB)**
- **NCAR MM5**
- **Nested Grids**
- **FDDA**
- **ADAS**
- **LEADS Visualization**

MeteoStar® ... The Weather Symbol Of

SSESCO

EWB 3-D / 4-D Display



Combine available data types for 3-D and 4-D Displays

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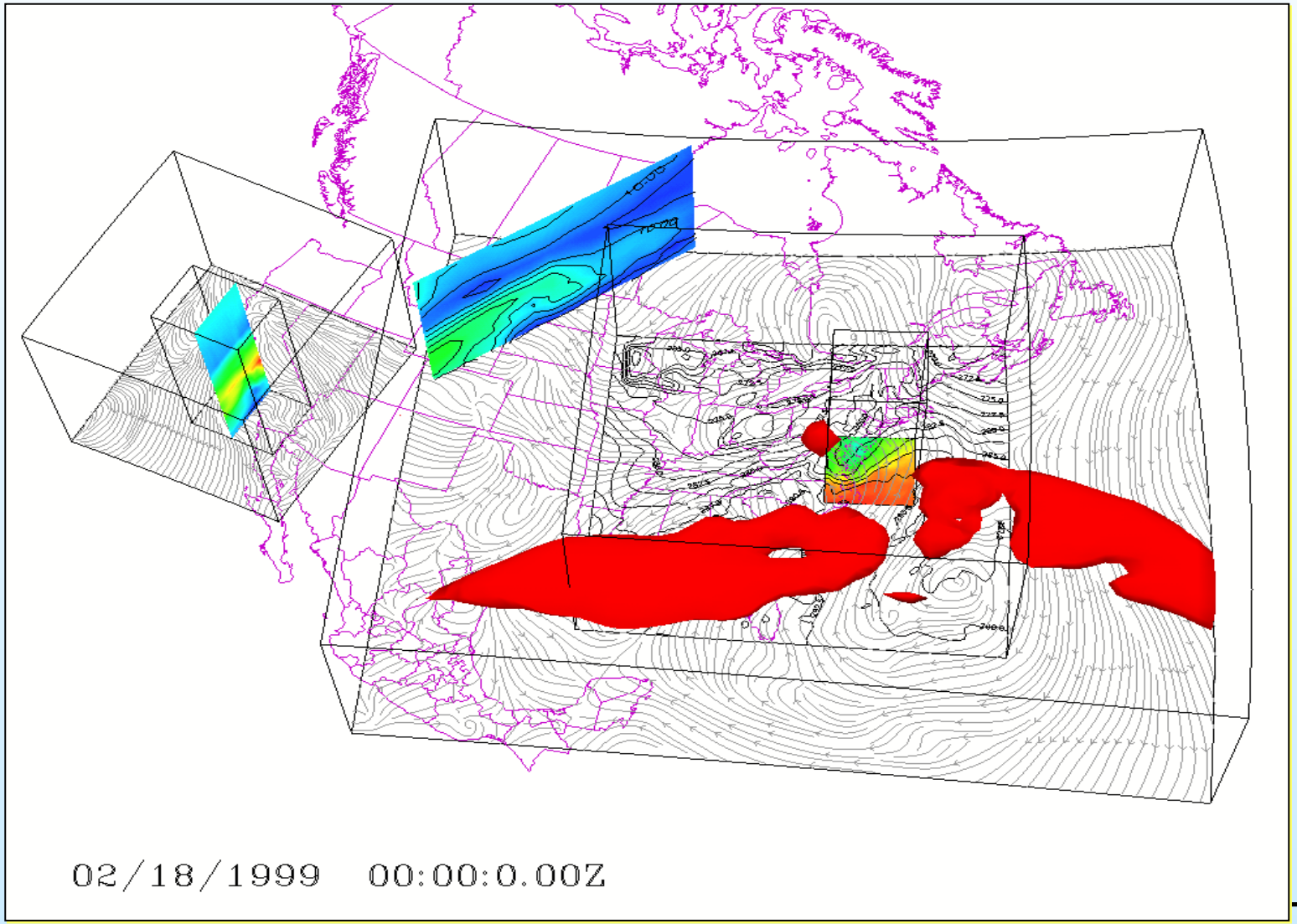
SSESCO

IPS / SSESCO 3-D Display (EWB) System



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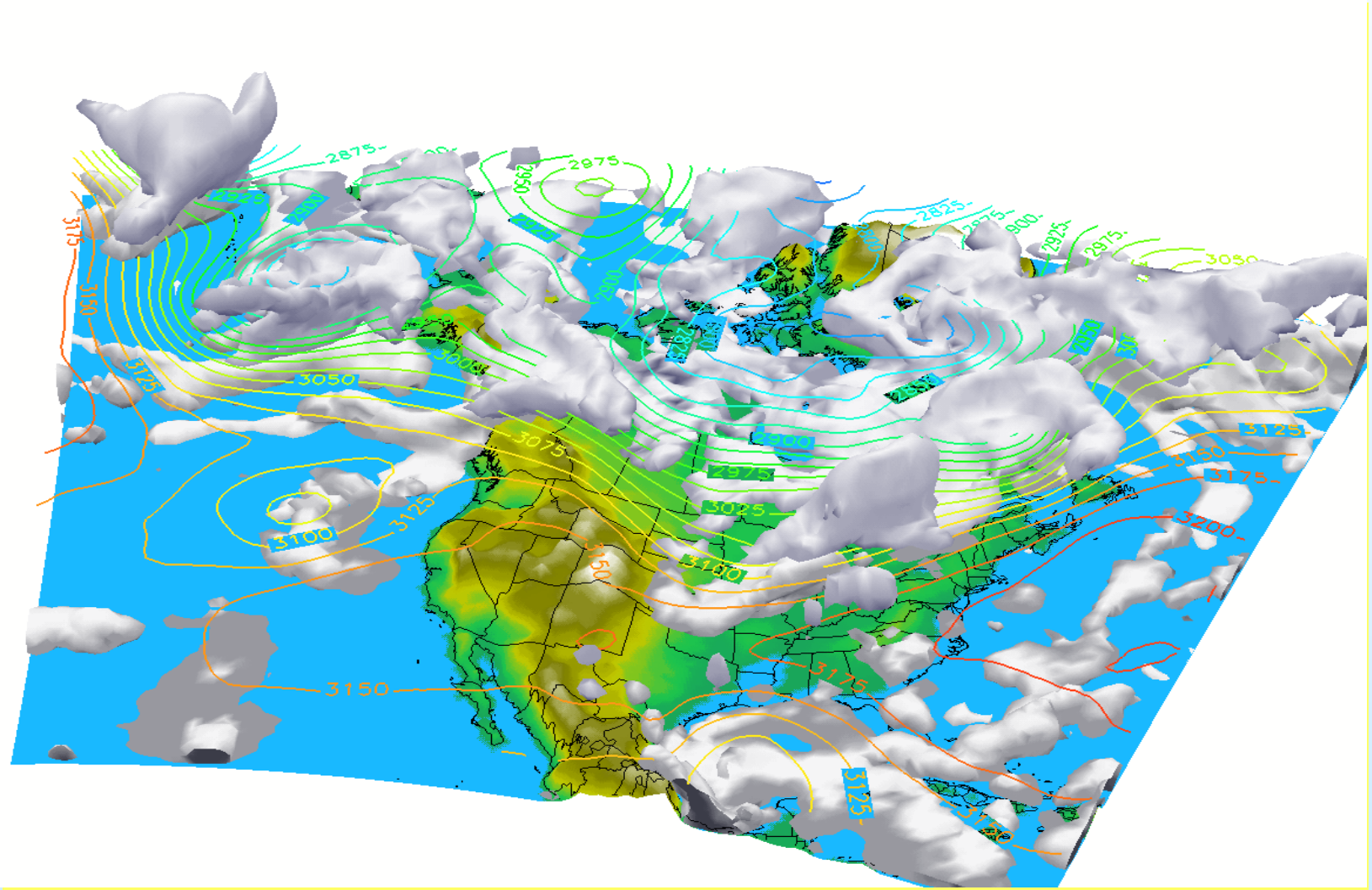
SSESCO

IPS / SSESCO Numerical Weather Prediction Systems



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IPS /SSESCO Numerical Weather Prediction Systems

- *Use of the NCAR MM5 Model for Regional and Fine-Scale Forecasts*
- *Support provided by the IPSM and SSESCO*
- *Use MM5 Four Dimensional Data Assimilation and University of Oklahoma ARPS (or equivalent) Data Assimilation System (ADAS) to perform analyses and initialize the Regional and Fine-Scale Models*
- *Three levels of model nesting*
  - *Large Scale Prediction Model*
    - ✓ *Use Global Model from a "National Center"*
    - ✓ *For example, use the National Centers for Environmental Prediction (NCEP) Aviation (AVN) and Medium Range Forecast (MRF) models for long range predictions and initial/boundary conditions for higher resolution models*
  - *Regional MM5*

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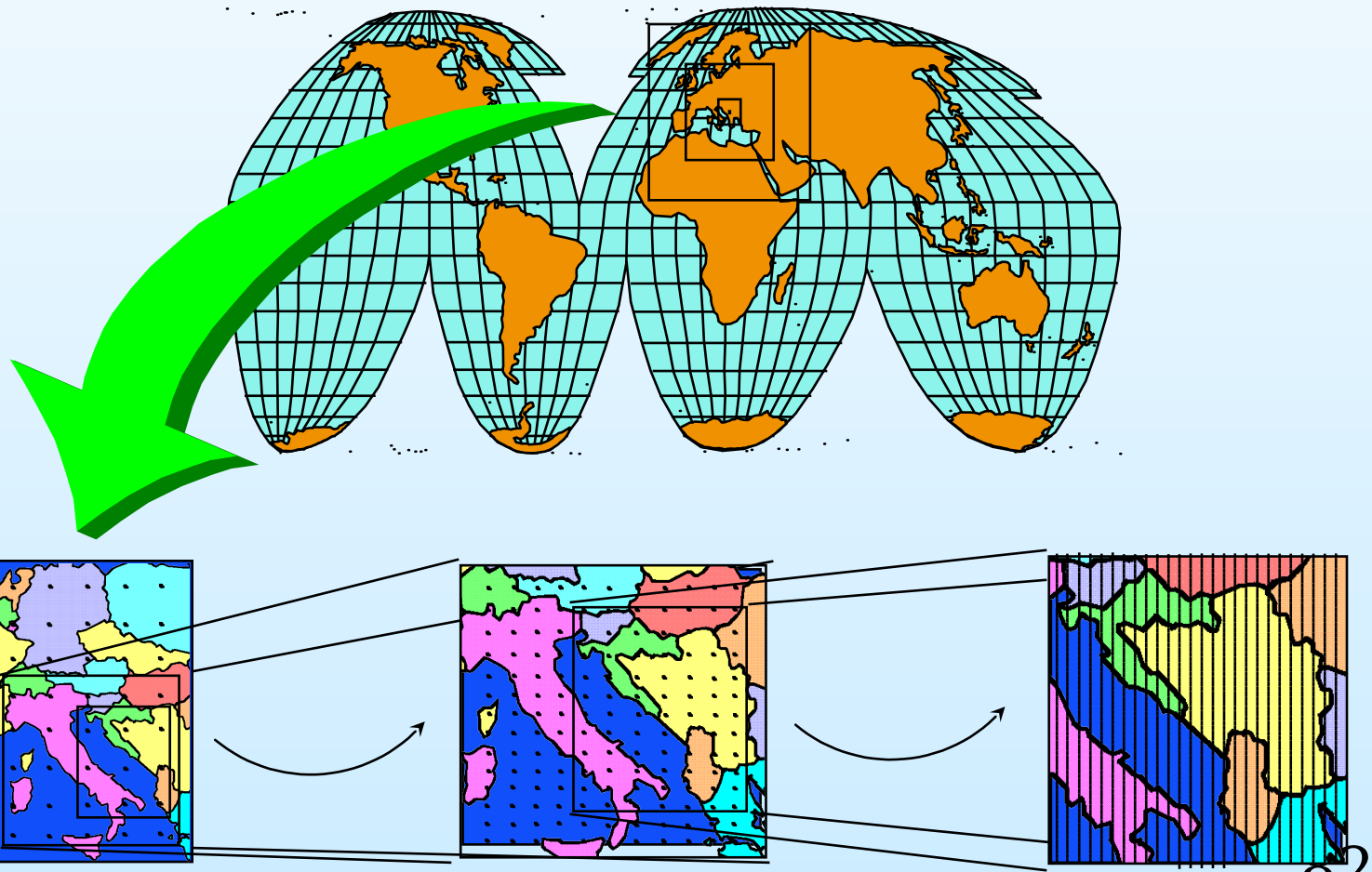
NUMERICAL WEATHER PREDICTION -- NESTED GRID



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NCAR MM5

- *Highly accurate mesoscale weather prediction model with inner nesting capability*
- *Can run full spectrum of resolutions, from 45 to 15 kms…and higher (5 km, 1.6 km)*
- *Used by the several Countries for 0 – 72 hour forecasts of worldwide weather conditions, including tropical cyclones…model currently run over many parts of the world with good success*
- *Sophisticated output parameters, including precipitation, thunderstorms, 3D cloud fields, classical weather parameters, and much more*
- *Ideal for Weather Center Operations*
- *High quality, maintainable code…source code available from NCAR for worldwide distribution*

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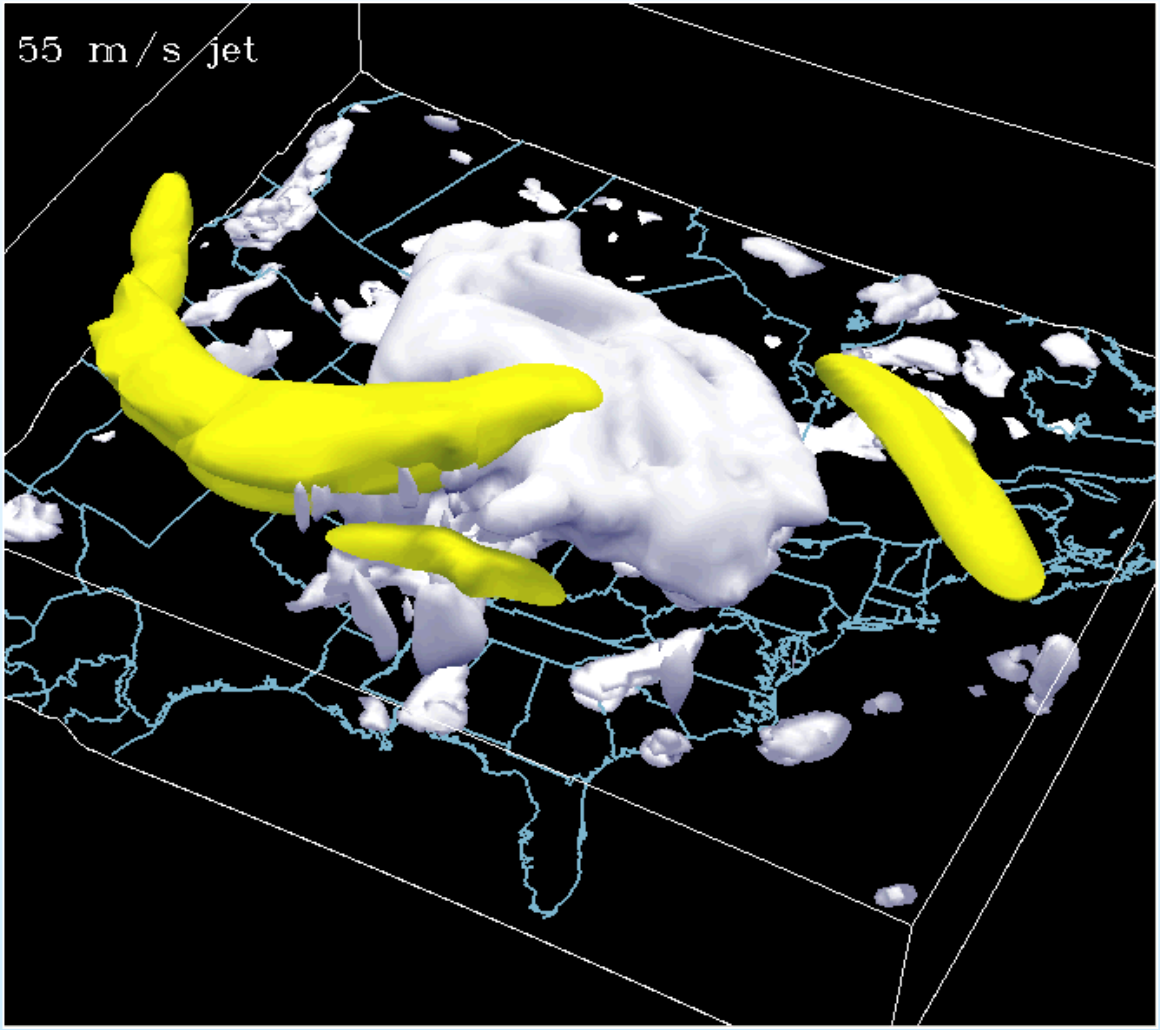
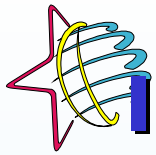


MM5 Forecast Explosive Storm Development

Diagram shows 55 kt Jet (yellow) with Model Output Clouds (white)



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Four Dimensional Data Assimilation (FDDA)

- ***Built into MM5***
- ***Continuous nudging cycle introduces data into model without "shocking" the dynamics… yields more accurate forecasts!***
- ***Analysis nudging using ADAS output for MM5 Regional Model***
- ***Direct observation nudging for inner fine-scale MM5 Model, allows for inclusion of asynoptic observations…yields most accurate predictions!***

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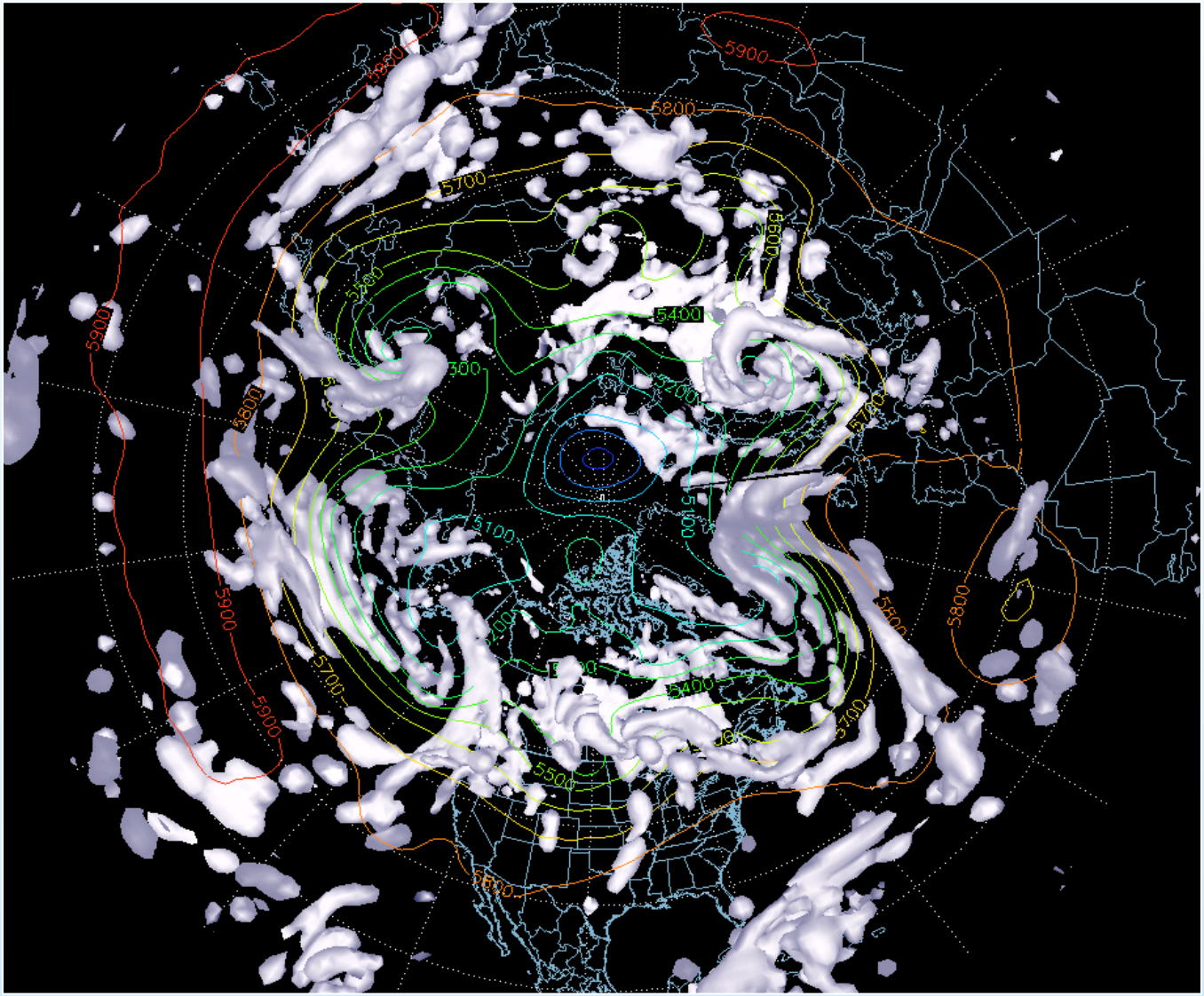

MM5 Nudged Cloud Field

Diagram shows Model Output Clouds (white) with 500 mb Height Contours

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University of Oklahoma ADAS or Equivalent

- ***Combines First-guess fields from large scale-NWP with surface, upper-air, satellite, radar, and special observing systems***
- ***Utilizes efficient Bratseth iterative OI assimilation***
- ***Sophisticated 3D cloud analysis***
- ***High quality, maintainable code***

Integrated Terminal Weather System

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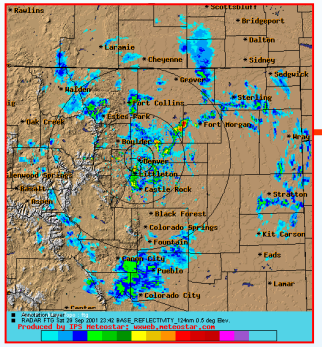
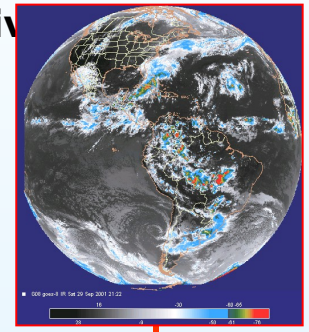
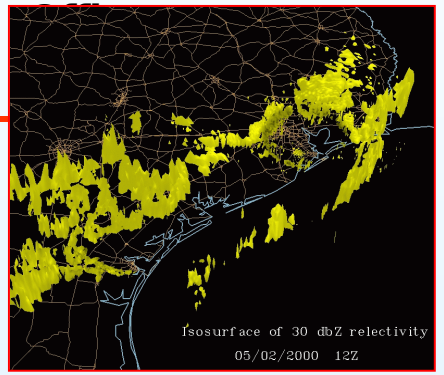
Weather



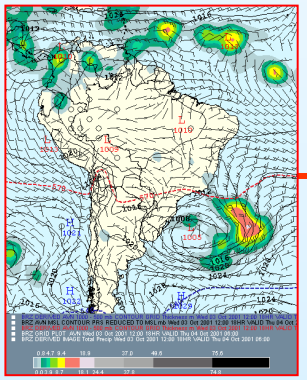
GEO/Polar Satellite Receiv



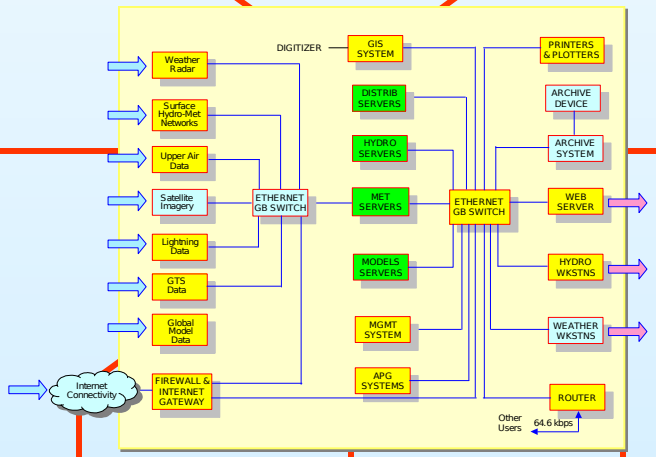
Director's



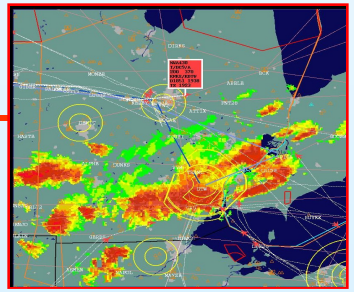
WAFS/SADIS



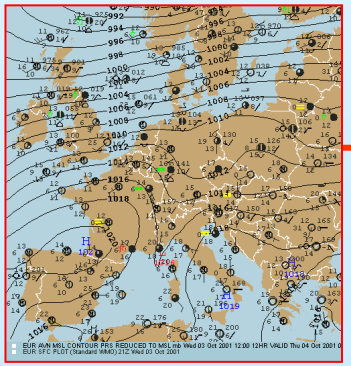
IPS Engine



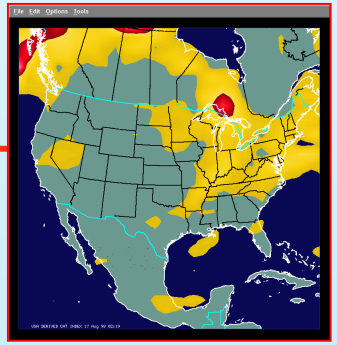
ATC Tower



GTS/AFTN



Users



ASOS

EDDS 032350Z 25005KT 8000 RA
FEW009 SCT030 BKN050 14/14 Q1015

EDDS 031600Z 040018 28006KT 9999
SCT015 BKN030
TEMPO 0007 4000 RA BKN008 PROB30
TEMPO 0004 2000 TSRA BKN010CB

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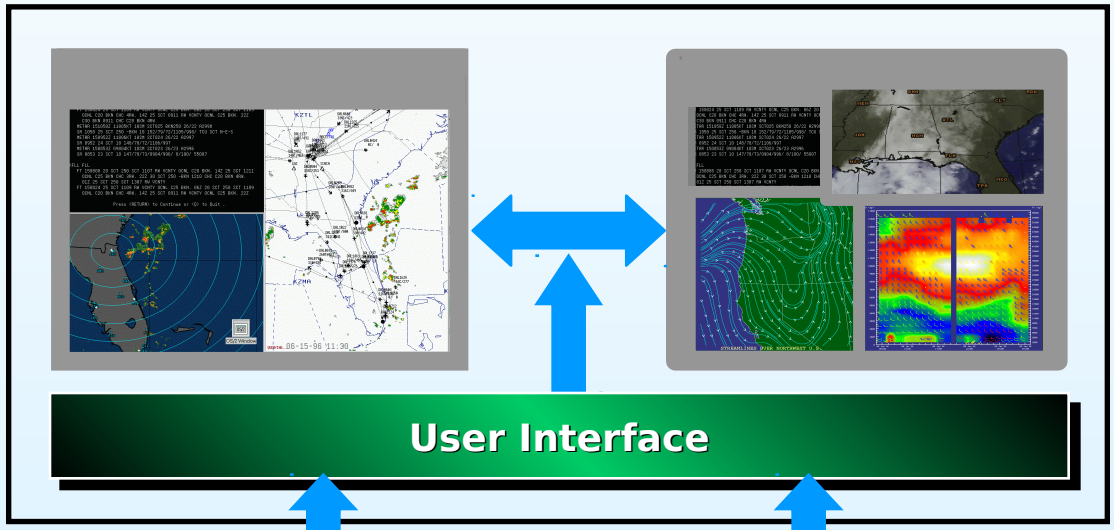
Flight & Weather Information & Decisions Support System (FltWinds)

User Workstation
- *1 OR 2 CRTs*
- *1 Keyboard*
- *1 Mouse*



UP TO 30:
- *THIN CLIENTS*
- *2-SEC RESPONSE*

Weather Products and Alerts

Flight Tracks and Alerts

Wx Data

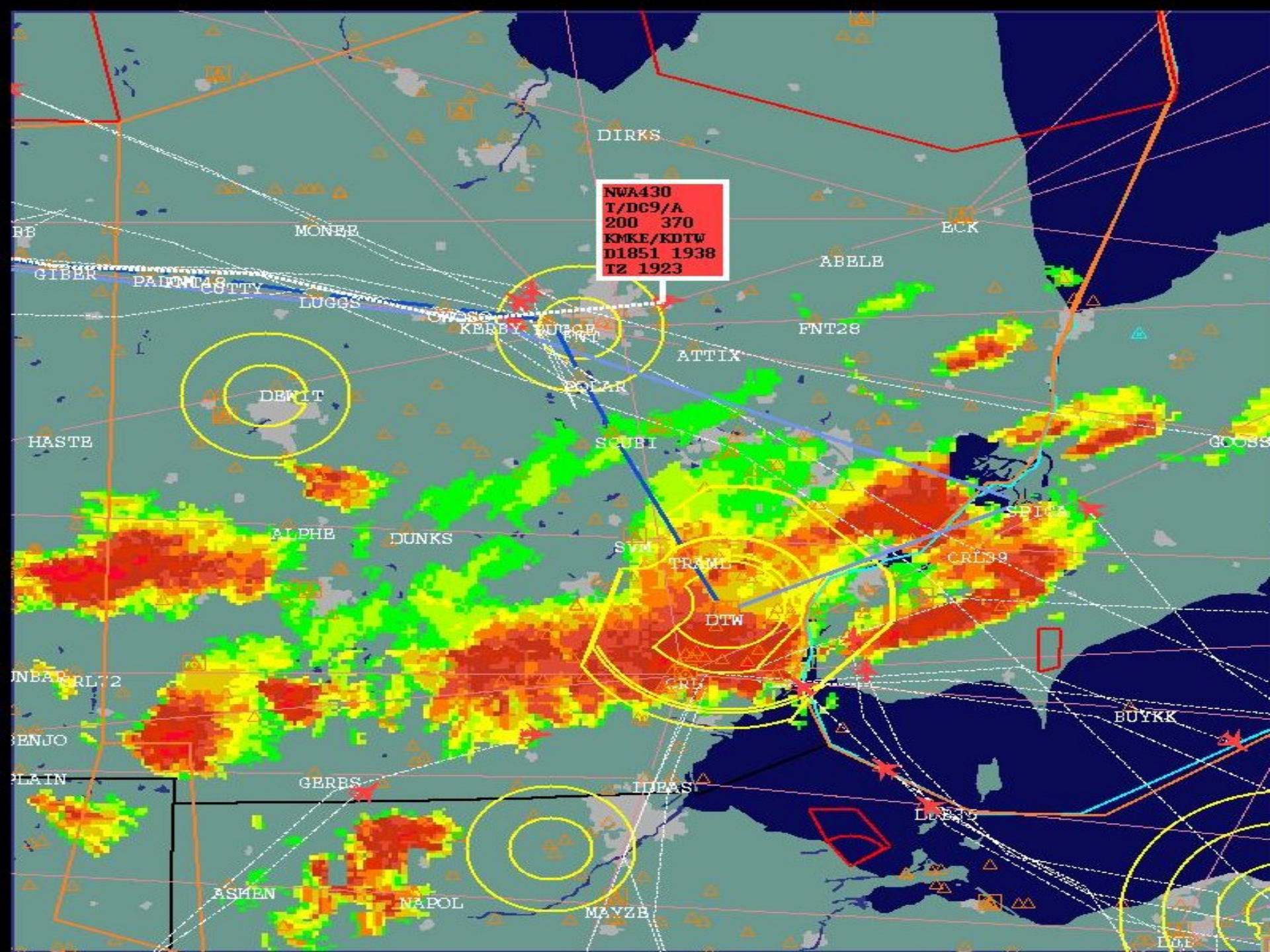
Weather Server

Flight Server

AOCNET

4-CPU HP SERVER

ARINC 424 Digital Chart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KMKE/KDTW
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FNT28
ATTIX
POLAR
DEWIT
HASTE
SCUBI
ALPHE
DUNKS
TRAME
CRL39
DTW
BUYKK
GERBS
IDEAS
ASHEN
NAPOL
MAYZE

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The IPS MeteoStar Advantage

Bottom Line

- ✓IPSM Provides Powerful, Operational Systems To Meet Navy's Needs
- ✓Continuous LEADS Improvements Underway
- ✓Oceanographic Functions Can Be Added ... CRADA Proposed
- ✓LEADS Marketed Internationally... IPSM Here For Long Haul
- ✓LEADS Supports Customer Specific Operational Needs

IPSM Committed to Making LEADS Very Affordable Through Enterprise Pricing -- We Want Long Term Relationships